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COMPUTERWORLD

GUI revs PCs at Big Six firm

BY MICHAEL FITZGERALD
CW STAFF

NEW YORK — Big Six stalwart Price Waterhouse will rip up its technology blueprint and splash into uncharted waters to boost productivity.

Price Waterhouse's Desktop '92 plan, which is expected to be launched in April, will help the international accounting and consulting firm move to a client/server software environment based entirely on graphical user interfaces, according to Sheldon Laube, national director of information and technology at Price Waterhouse.

Laube, at one time a strong IBM OS/2 backer, has already settled on Windows-based applications and a GUI: Microsoft Corp.'s Windows.

The decision to push ahead with the plan came in September when a committee made up of members of Price Waterhouse's international organization determined that GUI-based software would be stable enough to use by the middle of this year, Laube said.

A major decision will come in March, when Price Waterhouse determines whether to give the operating system nod to either IBM's OS/2 Version 2.0 or Microsoft's Windows 3.1.

The plan also calls for extensive use of notebook computers worldwide, as well as the replacement of about one-third of the firm's 25,000 PCs based on Intel Corp.'s 80286 chip with notebooks and I486-based desktops, by mid-1993. Currently,

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Rebuilding from scratch

Price Waterhouse's PC revamping includes the following measures:

- **Follow a client/server philosophy with Lotus' Notes as the communications medium.**
- **Adopt Microsoft's Windows graphical user interface; deploy core applications optimized to that specification.**
- **Replace one-third of 25,000 PCs based on 286 chip with notebooks and 486 desktop machines.**
- **Bolster support with more sophisticated personnel working from regional centers.**

EDS hits CA with suit on license practices

Says vendor fails to honor contracts, promises

BY NELL MARGOLIS
CW STAFF

DALLAS — Computer Associates International, Inc.'s controversial software licensing and maintenance practices last week earned the software giant an invitation to appear in court at the bidding of computer services provider Electronic Data Systems Corp.

In a suit filed in federal district court here, EDS said CA has refused to provide support and maintenance under existing contracts; jacked up fees for spurious reasons; capriciously blocked software upgrades and transfers; and churned up trouble between EDS and its customers, both existing and prospective.



EDS hurled nine counts of unsavory business dealings at CA, ranging from breach of contract, copyright abuse, fraud and extortion to interference with EDS' business relationships, illegal acquisition and monopoly of the U.S. systems software market. The suit reflects in part a long-simmering dispute between CA and professional services firms over the transfer of software licenses in outsourcing deals, observers said.

In its complaint, EDS alleges that CA's behavior "reached its nadir when . . . CA fraudulently obtained $4.7 million from EDS." The money, paid in a good-faith attempt to settle the firms' manifold differences, changed hands but not CA's behavior, EDS said.

"We had absolutely no choice but to take them to court," EDS spokesman Roger Still said.

CA's counterclaim is in the mail — or about to be.

"CA will not only defend itself against these contrived claims but will also seek, among other things, actual damages amounting at present to hundreds of millions of dollars from EDS," a statement issued by the firm said.

Dismissing EDS' claims as no more than "an attempt to cover up a long-standing intentional course of wrongful conduct" of its own, CA made clear that it has no intention of being run over by the General Motors Corp. subsidiary.

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GE Telecom to impose order on corporatewide LAN chaos

BY ELISABETH HORWITT
CW STAFF

FAIRFIELD, Conn. — General Electric Co.'s Telecommunications Department has been put in charge of bringing some degree of centralized management and standardization to local-area network installations across GE's diversified businesses.

The department hopes to have hammered out its strategy for interconnecting and centrally managing LANs by June, and it plans to begin implementing the architecture shortly thereafter.

LAN interconnectivity is not the only area due for consolidation and standardization at GE. The company is also seeking to standardize and coordinate desktop purchases through a recently signed, five-year contract with Electronic Data Systems Corp. [CW, Dec. 23/Jan. 2]. A year-old effort to consolidate GE's 29 data centers into a few centrally managed supercenters is also under way.

A $58 billion company with "hundreds or even thousands" of LANs installed, GE businesses are "just beginning to get

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GE's Welland: *'We think we've caught it just in time'*

HP lauded for fast, flexible stations

BY MARYFRAN JOHNSON
CW STAFF

Using a recession-minded strategy that companies such as GE Aircraft Engines, Northrop Corp. and Federal Express Corp. are already following, Hewlett-Packard Co. plans to unveil today the fastest low-end Unix workstations in the market.

That strategy closely links the new HP/Apollo 9000 Model 710s and Model 705s with HP's line of X terminals in package deals designed to pare down the cost per seat in that price-sensitive, $5,000-to-$10,000 spot in the workstation market.

The target is a broad one: customers at the same organization with a range of needs.

Cost name of the game

"As money gets tighter, we can't roll out the workstations as fast as we'd like. But we can do it with X terminals," said Taz Thompson, senior staff engineer at Cincinnati-based GE Aircraft Engines, which is installing roughly 400 of the Model 710s this year.

Thompson said GE is still examining scenarios involving X terminals. "We will be piloting some X terminals and high-end, graphics-accelerated X personal computers in two or three of our engineering areas by the end of this quarter," he said.

At Northrop's Palmdale, Calif., aircraft manufacturing plant, installation of 91 HP workstations and 285 HP 700/RX color X stations began last month, said Harold Hickman, director of the corporate data center in Hawthorne, Calif.

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Product Spotlight — Not every Windows application is a good Windows application. Page 65.

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"Computer Associates needs a message from the customer base."

DOUG UNDERHILL
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The 5th Wave



"WAAAIT A MINUTE - NO WONDER IT NOT WORK. YOU BUY ADOBE SOFTWARE! ADOBE NO WORK IN THIS ENVIRONMENT."

EXECUTIVE BRIEFING

■ **EDS sues Computer Associates,** charging that CA failed to honor contracts, increased fees and caused trouble with EDS customers. CA vigorously denies the charges and is hinting at a countersuit. The dispute revives a controversy over CA's licensing practices. **Page 1.**

■ **Computing with Windows** is more than painting a screen with pretty icons. Other criteria to look for when choosing a suite of Windows applications include consistency with other applications, means to customize applications to fit individual needs, the ability to integrate data and applications, an accurate and capable WYSIWYG display and performance that's not perceptibly slower to seasoned DOS users. **Page 65.**

■ **HP goes on the offensive** with a new line of speedy workstations that feature an X terminal sidekick to lower the cost per seat. Users and analysts applaud the strategy, and even competitors admit HP has the price/performance edge. **Page 1.**

■ **Cisco Systems shelves its plan** to provide front-end processor functions in its routers, opting instead for IBM's more popular APPN scheme. **Page 4.**

■ **Sears' cost-cutting efforts take a high-tech track.** The company hopes point-of-sale systems will help it slash 7,000 jobs. Its surprise choice for PC vendor: mail-order clone maker Compuadd. **Page 7.**

■ **Price Waterhouse overhauls** its PC strategy in a $15 million project featuring 486 PCs, notebook computers and groupware. A big surprise: the onetime OS/2 stalwart picked Windows as its interface of choice. **Page 1.**

■ **Despite Microsoft's LAN Manager 'jihad,'** some network managers are still nervous about the network operating system's future. The big question is how LAN Manager will fit in with a more network-capable Windows NT. **Page 4.**

■ **Eyes will be on Apple's Quicktime** multimedia operating system at Macworld this week. But third-party suppliers will make the push with Quicktime-compatible products. **Page 41.**

■ **DEC will take another shot at the imaging market,** emphasizing a modular approach. Its previous offering was criticized for its bundled packaging and lack of PC support. **Page 100.**

■ **IBM finally gets some good news on OS/2.** Users of the early production version released two weeks ago say it looks sound. **Page 6.**

■ **Show us an abandoned CASE tool,** and we'll show you an IS manager who ignored developer needs when choosing the product. Knowing what your developers want in a CASE tool — be it ease of use, ability to produce structured code or support of a firm's windowing system — will ensure its use. **Page 77.**

■ **A lot of CASE tools promise to build client/server applications,** but users who have been burned in the past are wary of what vendors tell them. **Page 33.**

■ **Tough economic times and improving communications services** are rejuvenating interest in public data networks. An increasing number of network managers are leaning toward public networks instead of private ones. **Page 51.**

■ **On site this week:** Workstations are on the rise at McDonnell Aircraft. For years, aircraft design has been concentrated on mainframe-based systems. But now, McDonnell Aircraft is rapidly expanding its use of Unix workstations supporting such applications. **Page 41.** Coca-Cola Bottling Co. of New York has developed a taste for relational database management. The bottler has begun the transition to an all-relational architecture that it hopes will carry users past the year 2000. **Page 35.** Rather than turn to third parties for help in its migration from a Wang VS minicomputer to an IBM RISC System/6000-based platform, the Presbyterian Church (USA) Foundation opted to do the software rewrite itself. **Page 43.** More than a year of testing persuaded Huntington Bank to try a modular approach to the design of its executive information system, which will be based first on MS-DOS and then on OS/2. **Page 43.**



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1906 - 1992

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Cisco to redraw APPN strategy

Backs off from providing 3270 traffic routing to hasten support of APPN

BY JOANIE M. WEXLER
CW STAFF

MENLO PARK, Calif. — Cisco Systems, Inc. said it will come clean this week with its revamped strategy for carrying IBM traffic through a multiprotocol router network by supporting IBM's Advanced Peer-to-Peer Networking (APPN) protocol.

However, users urging Cisco in that direction will have to sacrifice 3270 terminal traffic routing because APPN does not yet provide it.

Cisco confirmed last week that it is scaling back what observers have dubbed "technologically ambitious" plans to provide full PU4 (IBM front-end processor) functions in its internetworking devices. Reducing the nontrivial PU4 re-engineering efforts will allow Cisco to support APPN on its routers more quickly, a Cisco spokesman told *Computerworld*.

Cisco said it has discovered that its "customer base doesn't want full PU4 routing" and is instead demanding APPN. Cisco's APPN statement of direction has now become "something we're actively working on," the spokesman said.

APPN is IBM's fledgling strategy for "flattening" its hierarchical Systems Network Architecture (SNA) networks into networks of IBM devices that communicate directly with one another instead of up through a higher level computer. APPN is currently available from IBM for its midrange systems and 3174 cluster controller.

However, unlike a PU4 device, APPN does not yet handle the routing of 3270 terminal traffic, which accounts for more than 90% of all IBM traffic, noted Dave Passmore, a partner at Ernst & Young's Network Strategies Group in Fairfax, Va. This leaves a large gap in integrated IBM networking needs for users who do not want to run separate networks for their terminal and local-area network traffic or live with the response-time unpredictability of encapsulating SNA traffic in a routable protocol.

"We will be running 3270 applications for the next 10 years, so unless APPN handles [terminal traffic], this is unacceptable to us," said Bruce Almich, technical manager of data communications at the Raleigh, N.C., data processing arm of the U.S. Environmental Protection Agency (EPA). The EPA is currently seeking a multiprotocol router to blend SNA networks and LANs.

Rick McGee, IBM's manager of communication systems architecture and development, has stated that APPN will eventually address 3270 traffic, though he has not clarified how or when.

APPN sales rising

The Cisco spokesman said the company surveyed more than 100 IBM-oriented Cisco shops, which indicated "PU4 sales are declining while APPN sales are up." That finding caused Cisco to revise its five-phase IBM traffic support plan, laid out a year ago, by cutting back on PU4 development and hastening its efforts with APPN.

"APPN is really more of a requirement [than PU4] because it is where IBM is going with its networking," said Roger Schjarback, a communications project leader at Cisco shop Hoechst-Celanese Corp., a pharmaceuticals firm in Bridgewater, N.J.

However, Schjarback added, "we were hoping for PU4 in the router so we could replace our front ends. If PU4 from Cisco is not available, we won't be able to do that."

An executive at a large U.S. retailer, who asked not to be identified, said Cisco's new strategy is in sync with his firm's needs because the company's SNA terminals are diminishing as the retailer moves away from SNA to "a more open, APPN-oriented environment."

Currently, IBM has made no announcements about licensing APPN Network Node — the software that allows IBM devices to perform routing functions — although there are rumblings that IBM will open it up to third parties when it announces its long-awaited RISC System/6000-based multiprotocol router this month.

Goal orientation

Cisco's two-year IBM plan is as follows:

PHASE 1: Support source-route bridging of Token Rings at 4M and 16M bit/sec. (available now).

PHASE 2: Encapsulate SNA traffic across wide areas in routable protocols (available now).

PHASE 3: Route IBM traffic across networks of mixed-topology LANs (under development).

PHASE 4: Bundle limited PU4 functions into routers (under development).

PHASE 5: Support and add value to IBM's APPN for peer-to-peer networking in IBM networks (under development).

Users caught in ball of LAN Manager confusion

BY JIM NASH
and JAMES DALY
CW STAFF

The continuing saga of the Microsoft Corp. LAN Manager shuffle has raised new doubts about the future of the embattled network operating system and has led some frustrated users to put their LAN Manager plans on ice.

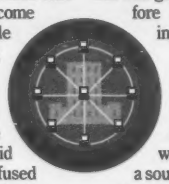
In the past month, Microsoft has announced yet another reincarnation of its battered network operating system, which thus far has shakily survived numerous other iterations (see story at right). The most recent reshaping of the LAN manager strategy appears to be a slightly schizophrenic existence as both a shrink-wrapped network operating system and a collection of add-on functions built into Microsoft's anticipated Windows New Technology (NT) operating system, currently slated for release before year's end.

To bolster the sagging LAN Manager's fortunes, Microsoft also folded the development teams for Windows, Windows NT and LAN Manager last month into one group, called the Corporate and Network Systems Group.

Paul Maritz was tapped to head the new group, while ex-network systems chief Mike Murray moved over to become vice president of human resources.

Under the new schematic, OS/2- and Unix-based LAN Managers will continue to be updated and supported, Maritz said. This will occur in tandem with development of NT as an operating system that contains fundamental networking capabilities such as file and print sharing. Network administrators will have the freedom, he promised, to choose add-on LAN Manager functions as well as those from other network operating systems, including Novell, Inc.'s Netware.

Maritz further claimed that it has always been understood that networking would become virtually inseparable from future operating systems.



Even so, most information systems managers and some industry analysts said they remain confused about LAN Manager's future. Some wondered if the software would become merely a collection of functions to be purchased separately as add-ins for NT.

"It puts us on hold," said Joseph Catino, information center manager at the Boston-based Massachusetts Water Resources Authority. "I can't just throw [LAN Manager] out the window, but I'm going to think twice before investing any more into it."

A LAN Manager pilot at an insurance company has also stalled, partly because of the software's uncertain future, a source at the firm said.

Even analysts who feel the reorganization strengthens Microsoft's hand in networking and client/server systems admit it muddies the water for users. "This will cause short-term confusion, with some users asking if this is a dead product," said Jamie Lewis, vice president at Clarke Burton Corp., a Salt Lake City networking consulting firm.

Fifteen months ago, Microsoft launched what it called a multimillion-dollar "jihad" aimed at dislodging Novell's Netware from its perch as the No. 1 network system software.

Key features targeted for improvement included remote management, distributed software, a directory service and security. Microsoft said it met this goal in the release of LAN Manager 2.1.

Still, LAN Manager users remain worried. Merely mentioning OS/2 to some LAN Manager users only adds to their caution. Tom Bernhardt, network architect at Star Enterprise, a Houston-based partnership between oil companies Texaco, Inc. and Aramco, said LAN Manager, which is used at Star, is superior to Netware. Nonetheless, he said, many managers fear LAN Manager may be sloughed off by Microsoft along with OS/2.

However, some network buyers give OS/2 a thumbs-up and approve of reports saying Microsoft will bundle LAN Manager into NT in much the same way that Unix systems tightly integrate networking features.

"Networking should be fairly well integrated into the operating system or it becomes something tacked on and awkward," said Bill Evans, staff software engineer at Baxter Healthcare Corp. in Deerfield, Ill.

Life and times of LAN Manager

No one can say LAN Manager users have not been the picture of patience. Microsoft's LAN Manager network operating system has lived several lives since its inception, as noted in the following chronology.

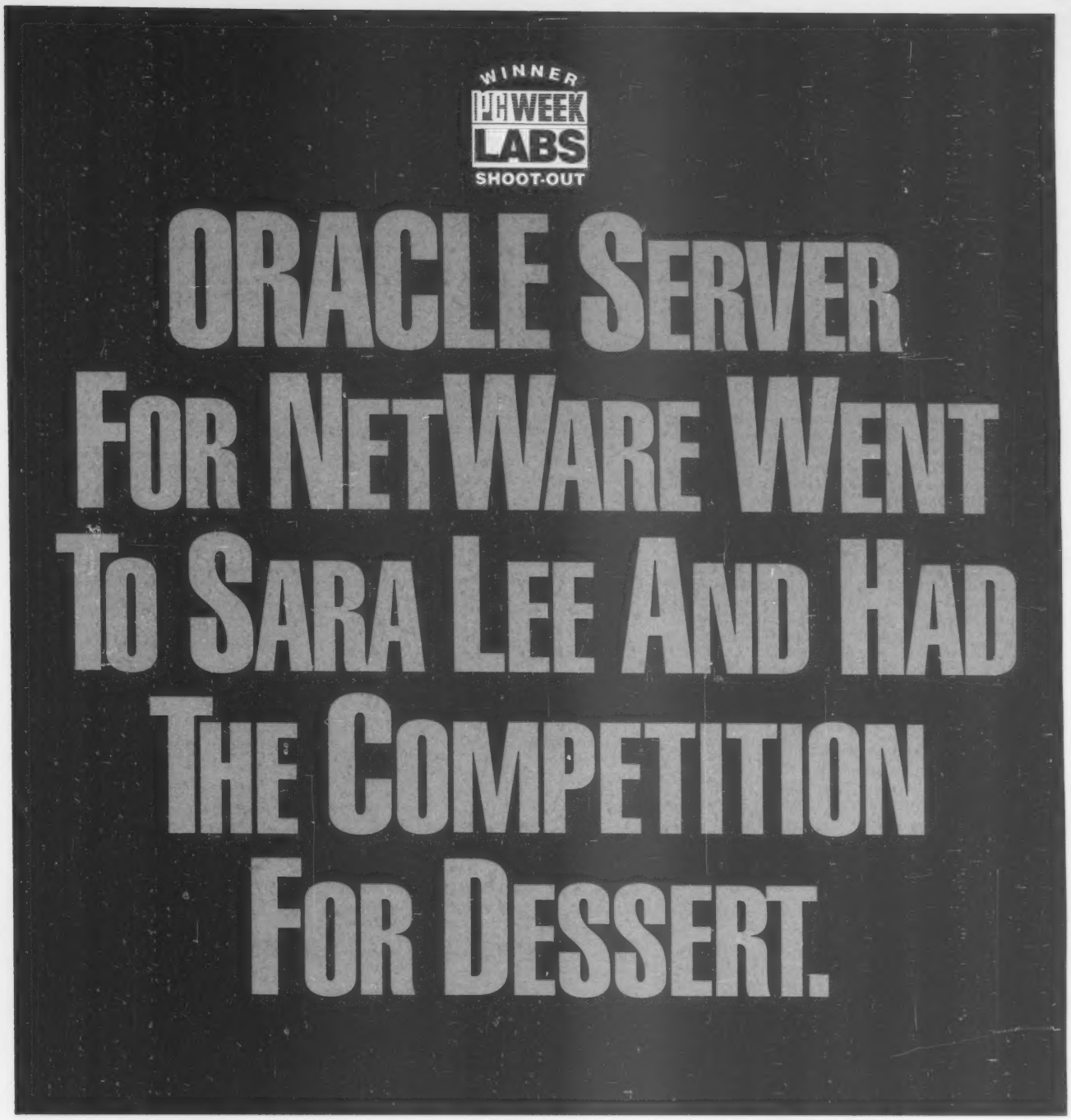
LAN Manager started out co-authored by 3Com Corp; it was positioned as an OEM product for customers such as Digital Equipment Corp., 3Com, IBM, AT&T and others.

What followed was a waiting game between Microsoft and IBM over whether IBM would endorse LAN Manager, which it eventually did, marketing LAN Server, its version of LAN Manager.

In April 1990, after months of denials, Microsoft attempted to reduce market confusion by making a promise to consolidate and sell its own core, shrink-wrapped LAN Manager based on OS/2. Last January, faced with discouraging sales and direct competition from Microsoft, 3Com opted out of its reselling contract in exchange for all the technical additions it made to the software.

But another problem popped up when it became clear that IBM and Microsoft might be going in different directions with LAN Manager. This was supposed to be resolved once the vendors agreed in 1990 to "converge" their two server products, emphasizing they would provide the same drivers and work out differences between their interfaces. The two completed 70% of the application programming interface compatibility work before the effort stalled, leaving user interface and systems administration differences to be resolved [CW, July 29, 1991].

JIM NASH



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—PC Week June 24, 1991

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NEWS SHORTS

First Interstate consolidates

First Interstate Bancorp said last week it has completed a massive four-year data center consolidation, cutting 1,400 information systems jobs with a projected savings of almost $100 million in annual expenses. All IS operations supporting its banks and subsidiaries in 13 states are now performed in Tempe, Ariz., and Portland, Ore. Between 1988 and 1990, First Interstate consolidated 11 data centers into four and cut its operations staff from 2,100 to 700.

First CASE on Unix

Texas Instruments, Inc. and Hewlett-Packard Co. announced an agreement to port TI's computer-aided software engineering (CASE) tools to Unix-based HP 9000 machines. TI is reportedly the first integrated CASE vendor to announce formal plans to port its workbench to a Unix platform. Information Engineering Facility (IEF) for the HP 9000 is scheduled for release in several stages, beginning in first-quarter 1992 with an IEF module. Prices for that initial component will range from $6,300 to $30,000, according to a TI spokesman.

FTC OKs Apple/IBM match

The Federal Trade Commission (FTC) recently gave a green light to the planned Apple Computer, Inc./IBM partnership but continued to investigate reports of unfair business practices on the part of both Microsoft Corp. and Intel Corp. A Microsoft spokesman said the company has no idea when the FTC's probe will be completed or its results announced. Intel officials said that a series of internal documents were provided to the FTC at its request on July 17, 1991. Intel also said the FTC has indicated it may want to interview some Intel officials.

IBM cuts PC prices again

IBM cut prices again last week on Personal System/2s, this time lowering prices between 10% and 16% on two of its AT bus, Intel 80386SX-based PS/2 models. With the cuts, a PS/2 Model 35 lists for $1,745 with 2M bytes of random-access memory, and the basic Model 40 starts at $2,000, with a similar configuration. IBM also said it has been shipping $780 upgrade kits based on its SLC processor since last month. The SLC is an IBM-designed, souped-up version of the 386SX.

Codex lays off 400

Communications equipment provider Motorola Codex announced a layoff last week of 400 employees because of the elimination of some old product lines and refocusing of its sales and distribution away from strictly component business (see story this page).

USAF throws out huge PC buy

The U.S. Department of Defense's effort to conduct a fast-track procurement for $1 billion worth of personal computers backfired last week when the U.S. Air Force canceled its Desktop IV contract award to Compuadd Corp. and Sysorex Information Systems, Inc. IBM, Apple Computer, Inc. and six other bidders had protested the November award by saying the shortcut procedures unfairly knocked them out of the running. Separately, a federal appeals panel denied a protest by Computer Sciences Corp. (CSC) about the U.S. Army's 11-year, $1.6 billion award to The Boeing Co. for an automated reserve mobilization system. CSC argued that the Army had failed to show how Boeing's higher bid was justified by technical superiority.

Bull restructures

Bull HN Information Systems, Inc. announced a restructuring plan that it hopes will bring it closer to its customers. The Billerica, Mass.-based subsidiary of Groupe Bull now has five "customer-dedicated business units," according to a statement released by Axel Leblois, Bull HN's chief executive officer.

More news shorts on page 100

Codex goes paperless with EDI

BY CLINTON WILDER
CW STAFF

MANSFIELD, Mass. — Motorola Codex will soon complete a three-year project that will completely eliminate paper — including the payment check — from its business dealings with key suppliers.

The communications equipment manufacturer will commence using an integrated electronic data interchange (EDI) and electronic funds transfer (EFT) system on a pilot basis with supplier Texas Instruments, Inc. sometime in the next couple of months.

When it does, it will be one of the few companies having an electronic "closed loop" from initial production plan to final payment, with EDI transactions integrated into its existing manufacturing, purchasing and financial applications, analysts said.

Codex expects cost savings in areas including reduced product cycle time, supply inventories, paperwork and filing. Several clerical employees have already been retrained for new positions.

Codex transacts about 40% of its purchase orders through EDI, but TI will be the first of its EDI-linked suppliers to receive its payments electronically. Codex hopes to expand EFT to its six top electronics components suppliers by year's end.

Codex's EDI program manager Joseph Salemi had many hurdles to overcome, such as "cheating" Codex's Dun & Bradstreet Software Millennium accounts payable application to create an ANSI X12 820 payment order file instead of printing a check. Salemi's team also had to build software bridges between the EDI system and a D&B Software AMAPS manufacturing resource planning system running on an IBM 3090 mainframe with MVS/XA.

Most of Salemi's hurdles were organizational, such as lining up executive support in manufacturing, finance and information systems and even finding a bank with the EFT capability that Codex's bank lacked.

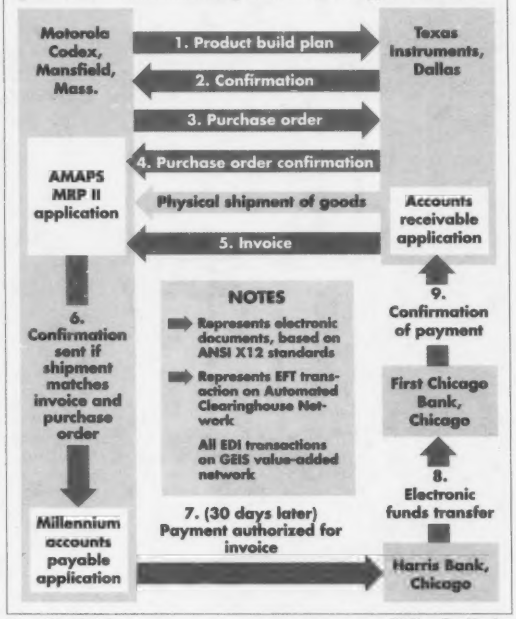
In the pilot, as soon as Codex receives goods from TI, the system sends an electronic payment authorization to Chicago-based Harris Trust and Savings Bank, which sends the payment over the National Automated Clearinghouse network to First Chicago Bank, TI's collection bank.

Future enhancements call for Codex to pay only for the goods it uses from any given purchase order, with the supplier benefiting from immediate payment.

"The supplier might deliver 100 pieces, but if I only consume 50, that's all I have to pay for," said Tony DeVito, Codex's vice president of manufacturing.

Closing the loop

Motorola Codex's electronic document interchange and fund transfer system ties the communications gear maker to its supplier and banker



Source: Motorola Codex

CW Chart: Tom Monahan

OS/2 2.0 LA code is stable despite some minor glitches

BY ROSEMARY HAMILTON
and CHRISTOPHER LINDQUIST
CW STAFF

IBM has apparently scored some badly need points with the delivery of its Limited Availability (LA) version of OS/2 2.0.

While some users have reported minor technical problems with the software, a number of those contacted last week said they are satisfied with the overall quality of this release.

"It's not what I'd put in the general public's hands yet," said Larry Waibel, systems support manager at Cubic Automated Revenue Collection in San Diego. He encountered an installation problem with his Logitech, Inc. mouse. However, Waibel said he had been working with the LA code for three days, and "basically, on a daily basis, I'm saying more and more, 'Oh wow, this is neat.' "

The on-time delivery of the LA code was critical to IBM because of the credibility problems the company has had concerning the desktop operating system.

OS/2 users said the LA code, which IBM shipped in the final hours of 1991, is essentially what the company had promised: a stabilized version of OS/2 Release 2.0 beta code. This version does not have the so-called seamless integration with Microsoft Corp. Windows applications nor does it have a 32-bit graphics engine. Both are expected in the general availability release scheduled to ship by the end of March.

"IBM more than met its commitment, in my view," said Don Babcock, manager of user services at Cajun Electric Power Cooperative in Baton Rouge, La.

"We needed to do multitasking more than just task switching. We tried Windows, but it just wouldn't do it. Needless to say, this latest LA release has more than met our expectations," he added.

Some users said IBM's apparent success with the LA code boosts their confidence in IBM's ability to deliver the full-blown OS/2 2.0 in March.

"They have some work ahead of them," said Bob Holmes, computer technology research analyst at Southern California Gas Co. in Los Angeles. "Given where they've been and where they are now, there's a good probability of them shipping [the complete] code."

Sears selects Compuadd for $53M POS project

BY ELLIS BOOKER
CW STAFF

CHICAGO — Sears, Roebuck and Co. said last week it expects to eliminate almost 7,000 jobs and cut expenses by $50 million a year once it finishes installing new point-of-sale (POS) systems at its 868 retail stores.

The retailing giant has selected Compuadd Corp. in Austin, Texas, to provide 28,000 custom-designed MS-DOS-based POS systems and related software. Compuadd said the $53 million order was the largest in its 10-year history.

The strategy of using computer technology to pare down its work force — now at 313,000 — improving efficiency and bringing all transactions closer to the "sales floor" has become critical as Sears struggles to survive in the prolonged weak economy.

The systems, which will be deployed at Sears stores in the U.S. and Puerto Rico by the end of the first quarter, will enable salespeople to issue Sears charge cards and gift certificates, access customer information and ring up orders.

The rollout has also necessitated some changes in the in-store and home-office computing environments, said Pat Recktenwald, field operations manager of the project. IBM Personal System/2s will eventually replace the Series/1 minicomputers that now run applications inside the stores, she said. In addition, some modifications were done to existing mainframe applications over Sears' private network.

No staff added

"We worked with our own people to do the programming," Recktenwald said, adding that Sears did not have to add information systems staff for the project.

Beyond the new functionality, training salespeople to use the new systems has been easier than it was on the existing NCR Corp. POS systems. "We've reduced training from three to four hours to 45 minutes," Recktenwald said.

The Sears deal validates the use of personal computers with cash drawers, which up to now have been viewed as an "overpowered" solution, according to Leone Johnson, director of retail automation research at Venture Development Corp. "A standard PC is more flexible because it opens the door to a variety of uses and software from a variety of sources," she said.

Johnson added that Sears, with its systems integration expertise, is perhaps in a better position than other retailers to take advantage of this.

About 1,000 full-time nonsales positions and some 5,900 part-time clerical positions will be eliminated as a result of the move, Sears said. The company said it expected minimal layoffs, the transfer of employees to vacant jobs and attrition to contribute to the job cuts.

A great unknown

Sears, Roebuck's selection of Compuadd to supply a new generation of retail POS systems surprised some observers because the IBM PC clone maker is an unknown name in this market segment.

NCR Corp., IBM and Siemens Nixdorf Information Systems, Inc. dominate the $700 million market, according to Leone Johnson, director of retail automation research at Venture Development Corp. Some 230,000 POS systems were shipped last year, Johnson said.

NCR and IBM also bid for the contract, which was awarded on Labor Day last year, a Compuadd spokesman said. Sears declined comment on the losing bidders.

The 28,000 Compuadd cash register terminals are based on Intel Corp.'s 16-MHz I386SX microprocessor. The 22,000 NCR POS terminals Sears already has will be upgraded with new software, the retailer said. Sears is the first customer of Austin, Texas-based Compuadd Software Consulting, a unit recently formed to handle special projects with major accounts.

ELLIS BOOKER

CORRECTION

Due to a chart coloring error on page 46 of the Dec. 23, 1991/Jan. 2, 1992 issue of *Computerworld*, the number of customers planning to purchase imaging equipment in 1992 was transposed.

Of the 751 respondents polled, 571 were first-time buyers, while 180 were upgraders.

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Unisys takes driver's seat at Subaru

BY NELL MARGOLIS
CW STAFF

BLUE BELL, Pa. — A $45 million outsourcing contract with Subaru of America, Inc. last week became Unisys Corp.'s third major step into the burgeoning commercial outsourcing market.

Under a preliminary agreement signed last week, Unisys Government Systems, Inc. will take over all day-to-day information systems functions for the Cherry Hill, N.J.-based car company, which is the U.S. sales and marketing arm of Japanese industrial giant Fuji Heavy Industries Ltd.

Subaru will continue to do its own software development.

Subaru's search for an outsourcing partner was launched two years ago, driven by cutthroat competition in the automotive arena and the consequent need to target maximum resources at "application development that would move the needle for the company," Senior IS Vice President Herman Berg said.



Subaru's Berg: *Competition drives outsourcing push*

"We had pretty strict requirements," he said. Saving money and retaining a 30-person IS team with an already established record for quality service loomed large on the list.

The Unisys deal provides for Carl Dadonna, Subaru's technical systems and support director, to remain at the head of the 30-person work force, eventually at a new, nonstop regional processing center to be established by Unisys at Subaru's existing Pennsauken, N.J., data center site.

Savings aims

As for savings, Berg said, a series of "specific goals and parameters built into the long-term, fixed-fee contract" give Subaru confidence that its goal of recapturing "at least 15% of our budget annually" is realistic.

In addition, Subaru — a Unisys shop since 1979 — insisted on an outsourcer that could provide IS management flexibility in the face of an eventual move onto other hardware platforms.

The current platform's manufacturer seemed an unlikely choice, Berg acknowledged — "that is, until we talked to Unisys and saw their record in the federal sector."

According to an August 1991 report in *Government Executive* magazine, the $10 billion computer company not only leads the pack of government contractors in hardware supply but also tops the list in computer services and software.

Many of the federal outsourcing contracts represented by this $371 million business, said Arthur Slotkin, Unisys vice president of systems support operations, are with mixed hardware shops. The firm is about three months away from announcing any more such deals, Slotkin added.

Three deals

Last week's agreement is Unisys' third in the booming commercial outsourcing arena. Last spring, the firm signed on to manage IS operations for Dallas-based petrochemicals manufacturer Rexene Products Co. Six months earlier, it had signed its first major IS outsourcing deal — a $30 million contract with Ford Motor Co., whose "satisfied customer" claims, according to Berg, were instrumental in leading Subaru to override the offerings of several high-profile outsourcing vendors and hand its IS steering wheel over to Unisys.

Outsourcing boom over? You ain't seen nothin'

BY NELL MARGOLIS
CW STAFF

Fads fade — and some industry observers have recently wondered whether the Fortune 1,000's recession-fueled fervor for outsourcing will wane as the economy waxes.

Bet against it, says Merrill Lynch & Co. outsourcing analyst Stephen T. McClellan. A slew of recent "megacontracts" ($500 million or so) have been signed, many more are currently in negotiation, and the timeless allure of fattening the corporate kitty while bootstrapping technological clout augurs an outsourcing market that could cannonball from an estimated $3.5 billion in 1991 to some $9 billion by 1995, he said.

McClellan further predicted in a report recently released that the market could reach as high as $15 billion to $20 billion later in the decade.

"This is a huge, burgeoning snowball rolling downhill," McClellan said last week. "This is not a market that's burning out — it's exploding."

More megadeals coming

Whether at home or abroad, he said, the current year among the leading outsourcers will be marked by fierce competition, an intensified scramble for differentiation, jockeying in the ranks and staggering deal values.

When 1991 numbers are tallied, McClellan said, the industry could be looking at upwards of 20 consummated megadeals in contrast to seven such deals in 1990 and 12 in 1989. The size of such deals has swelled as dramatically as their frequency.

The average 1991 contract was closed in the $500 million range, and two contracts — Computer Sciences Corp.'s (CSC) commercial sector debut as outsourcer of General Dynamics Corp. and IBM's Integrated Systems Solutions Corp.'s (ISSC) United Technologies Corp. deal, which officially closed last week — careened into the $2 billion to $3 billion stratosphere.

In sharp contrast, 1990 yielded only one outsourcing deal that topped $180 million.

The year just closed also illustrates the inherent caprice and potential bonanzas of the outsourcing market. Electronic Data Systems Corp. (EDS) won at least six of the year's 20-some deals, or about 40% in total value. CSC, however, logged 30% of the year's total with its sole entry. ISSC won some $1.2 billion worth of megacontracts.

Perot Systems Corp., still climbing toward the top ranks of outsourcing vendors, chalked up at least $500 million "and possibly considerably more by year end," McClellan said. Moreover, the Vienna, Va.-based up-and-comer scored a coup when it signed on to outsource information systems for NCNB, a thriving Midwestern-based regional bank holding company. "So much for outsourcing being the last resort of sick banks," McClellan noted.

This is just for starters, he said. He dismissed the suggestion that an expanding band of outsourcing vendors are about to saturate the market.

"Most of the Fortune 1,000 have major data centers," McClellan noted. "About 40 of them have outsourced so far. That's 4%. I don't think we have to worry about saturation at this point."

The threat of saturation recedes even further into the unforeseeable future as the leading outsourcing vendors begin to plant their flags in Europe.

Market leader EDS made the boldest strides onto Continental turf last year with its takeover of SD/Scicon, a UK outsourcing systems integrator with an established stronghold in France as well.

The eventual role of European outsourcing, McClellan said, ranks among the biggest question marks in the market.

"Europe is a real unknown quantity right now," he said. "In outsourcing, the jury's still out."

Outta sight

The outsourcing market is expected to more than double by 1995

1991*		1995*	
Company	Annual outsourcing revenue (in millions)	Company	Annual outsourcing revenue (in millions)
EDS	$1,200	EDS	$3,300
Computer Sciences	$400	IBM	$1,200
IBM	$350	Computer Sciences	$1,000
Fiserv	$225	Perot Systems	$500
Systematics	$225	Affiliated Computer	$425
Perot Systems	$160	Fiserv	$375
Affiliated Computer Systems	$155	Systematics	$350
Shared Medical Systems	$140	Others	$1,600
First Financial Management	$80		
Others	$600		
Total	$3,535	Total	$8,750

* Estimated

Source: Merrill Lynch & Co.

CW Chart: Eric Cormier

Troubled banks lead the parade

New Orleans-based bank outsourcing consultant M. Arthur Gillis said he knows a gator when he sees one, and Merill Lynch's Stephen T. McClellan's vision of an outsourcing juggernaut is not a crock.

In the banking niche alone, Gillis said in a report issued this week, outsourcing vendors have spent the past three years rolling up the score: 71 thrifts, 52 banks, nine foreign institutions and seven miscellaneous financing firms — all outsourced between January 1989 and December 1991.



By Gillis' reckoning, contract volume in the bank outsourcing field has increased by approximately 28% a year.

Little Rock, Ark.-based Systematics, Inc. won the most contracts (34) and compiled the portfolio with the highest asset value ($197 billion) Gillis said. However, he added that EDS still earns the largest revenue from bank outsourcing: some $700 million over the past three years.

Gillis gave short shrift to recent reports that imminent government initiatives aimed at closing down accounting irregularities said to have cropped up in some bank outsourcing deals will halt the bumper crop of deals currently being reaped by outsourcers.

"I've looked at some 139 contracts over the past four years, and only a handful have had any shady elements," he said.

A spokesman for the General Accounting Office confirmed last week that the office is readying an assault on questionable practices in bank outsourcing deals, including a pricing practice under which outsourcing vendors buy a bank's data center at book value rather than the generally lower market value — thus, in effect, providing the bank with a bailout as well as with outsourcing services.

Gillis said he knows of few such instances.

NELL MARGOLIS

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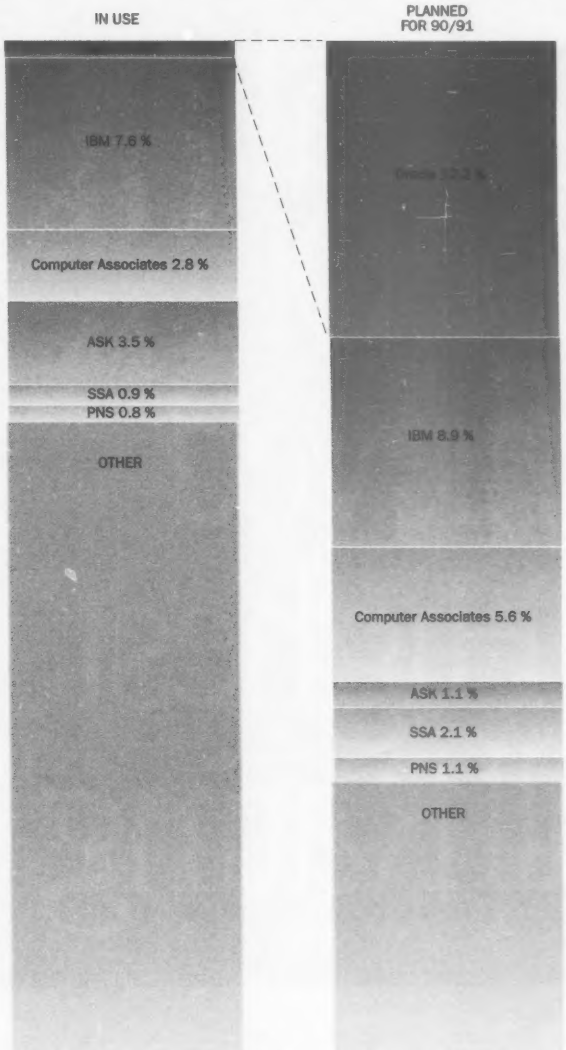
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Lotus outlines Notes enhancements

BY ROSEMARY HAMILTON
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. sketched out a 1992 plan last week that will bring several new functions to its Notes groupware product, a package that is increasingly key to the company's strategy.

During the next 12 months, Lotus will add expert systems-like components and multimedia capabilities to Notes, said John Landry, the company's recently appointed chief technology officer, in an interview last week. Landry said Lotus will introduce Unix support for Notes "within the next six months."

He also acknowledged that the firm will more closely integrate its Notes and CC:Mail electronic-mail products. The goal is to eventually provide a common E-mail function. "Later on this year, we'll be providing the capability to choose either Notes mail or CC:Mail from [within] Notes," he said.

Notes, a messaging and information management system designed for work groups on a local-area network, is considered a leading technology in the emerging field of groupware, according to analysts. The software, which includes a number of different group functions, also provides data management functions and design tools for creating Notes applications.

Lotus said it has signed up about 90,000 users at more than 250 firms since launching Notes in 1989. A big chunk of those accounts came in the past year. A company spokeswoman said Lotus had 75 Notes accounts — representing 35,000 licenses — in February 1991. She said the numbers are preliminary and do not include all the international results from the fourth quarter of 1991.



Lotus' Landry *put Notes first*

Since assuming his post at Lotus in late 1991, Landry has made Notes one of his priorities. "We want to have an [overall] coordinating, unifying architecture," Landry said, adding that in the future, Notes could serve as the umbrella under which other Lotus applications would be integrated.

"It's not taking place now according to the specifications I've laid out," Landry said of this integration. "We are refining it now." He did not elaborate.

In the meantime, Lotus will be introducing the following capabilities in the next year:

- **Expert systems-like components for Notes.** Landry referred to these functions as agents that will handle a user's correspondence. The idea is better management of information with intelligent, rules-based agents so that a user is alerted to important memos or documents and can weed out insignificant messages.

"Notes is somewhat passive now. We are going to activate it," Landry said.

- **Multimedia capabilities.** Currently, Notes can maintain read-only images so users can view this data but not manipulate it. "If we can pull it off, our intention is to have an implementation of [advanced imaging, sound and video] during this year. I can't guarantee it, but that's our intent," he said.
- **Unix support.** Landry said Notes will accommodate both Unix servers and clients and will announce support for both in the first half of this year.

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Oracle maintains profitable stance

REDWOOD CITY, Calif. — Oracle Corp. posted its fourth profitable quarter in a row last week, leading many Wall Street analysts to reduce their concerns about the $1 billion software firm's future.

Oracle reported net income of $13.5 million on revenue of $283.9 million for the second quarter, which ended Nov. 30.

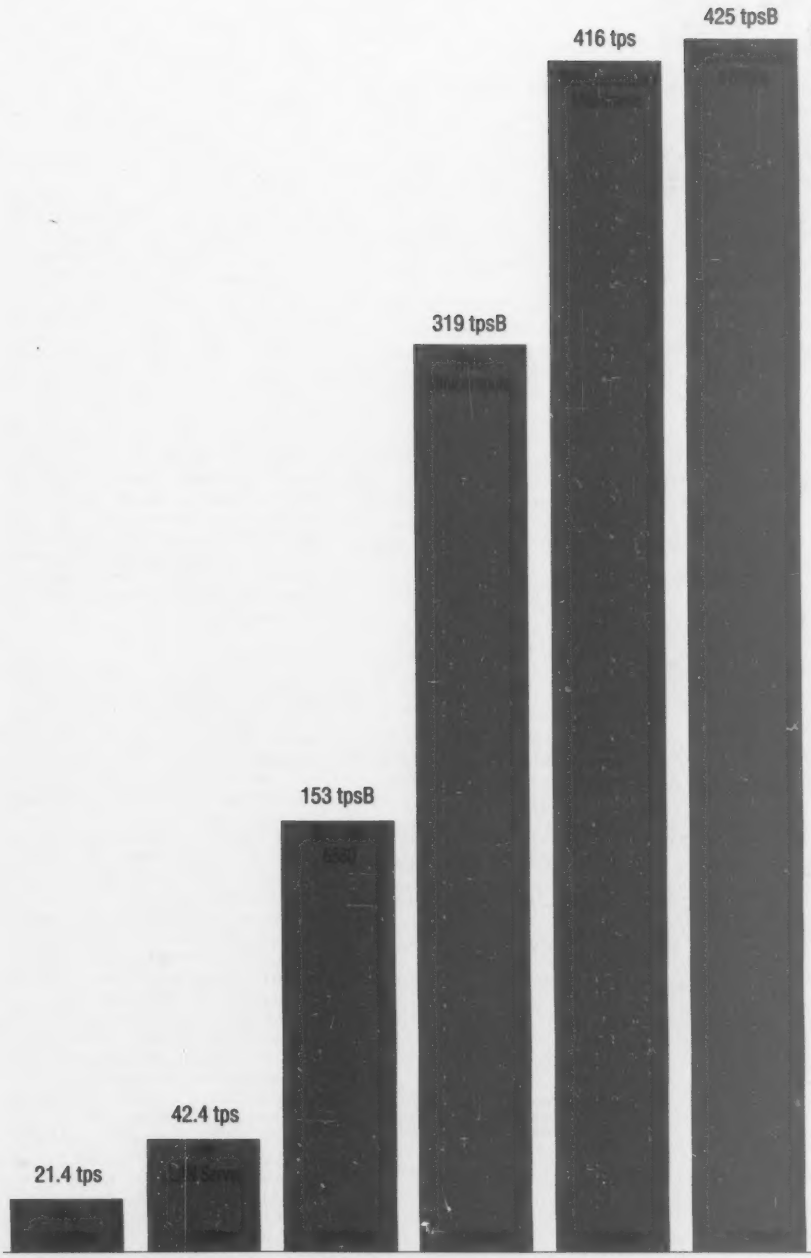
"Cash flow is up, the receivables are down, everything's going in the right direction," said Charles Phillips, a senior software analyst at Gartner Group, Inc.'s Soundview Financial Group, Inc. in Stamford, Conn.

Oracle has a single $80 million loan from Nippon Steel Corp. in Tokyo. It also has a $50 million line of credit with an international banking syndicate.

Recent quarters have also been profitable, thanks largely to several multimillion dollar deals that were part of Oracle's turnaround from its dramatic $28 million loss in the first quarter of fiscal 1991. "The company dodged a bullet by being able to bring in additional revenues from consulting at a time when these big deals didn't come through," said Terence Quinn, a vice president of research at Kidder, Peabody & Co. in New York.

JEAN S. BOZMAN

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Ten years after Bell breakup, local telcos come under fire

BY ELLIS BOOKER
CW STAFF

CHICAGO — When AT&T and the U.S. Department of Justice jointly disclosed a plan to break up the Bell System in January 1982, the prescient knew the local exchange monopoly left to the "Baby Bells" would come next.

They were right.

Ten years after divestiture, there is a healthy battle for market share in the long-distance arena. Attention has now shifted to the local loop, where the monopolies of the seven regional Bell holding companies and their operating telephone companies are coming under assault.

The pressure for change is coming from at least three directions:

- Alternative carriers have entered the game, constructing citywide fiber-optic networks in many cities that offer private data networks to business customers.
- State regulatory authorities, members of Congress and alternative carriers are asking for a change in the regulatory structure that gives local phone companies their regional monopolies.
- A rash of network outages during the past three years has underscored for users the value of redundant facilities and a choice of carriers. Users predict that further deregulation of the local telephone companies could spur valuable network services they can't currently get because of the absence of motivating competition.



William Micklin, manager of the telecommunications bureau in the city of San Francisco, said he has been trying to leverage new applications such as dark fiber, integrated services, voice processing and videotext from Pacific Bell, "but it is a very arduous process because of regulatory and organizational factors."

He cited the efforts of fiber bypass carriers as "attractive because Pacific Bell and other Bell operating companies are very poor when it comes to servicing data requirements — particularly fiber."

Currently, the alternative carriers collectively share about 1% of the $100 billion local loop business.

Another user said local phone companies don't have any incentive to provide certain features, such as voice compression, which would allow companies to pack more traffic onto fewer lines. "Carriers think they'll deprive themselves of some potential revenue [by leasing fewer lines] by deploying that technology when there is no competitive reason to do so," observed Phil Evans, director of telecommunications at FMC Corp. in Dallas.

Regulation is lagging well behind technology and market demand, said Royce J. Holland, president and chief executive officer of Metropolitan Fiber Systems, Inc. (MFS), an Oakbrook Terrace, Ill., company that has fiber networks in 12 cities.

MFS, not surprisingly, has its own deregulation plan before the Federal Communications Commission. It calls for the Bell operating companies to interconnect their networks with those of alternative carriers as well as to unbundle their current tariffs so that alternate carriers could buy them as needed.

Holland said he expects a ruling on special access interconnection in March or April and a ruling on switched access interconnection in 1993.

The Illinois Commerce Commission, meanwhile, has proposed a "free-trade zone" that would deregulate and give Illinois Bell Telephone Co. pricing flexibility in Chicago's downtown area. Carriers would be able to connect their lines to Illinois Bell switches, and Illinois Bell would have to "unbundle" various services, which the alternative carriers could buy as needed.

In the loop

New York has gone the furthest to deregulate the local loop. Late last year, the state ordered New York Telephone Co. to allow rival carriers to attach lines running from their customers' offices to its central offices. New York Telephone also has to offer unbundled prices for lines and switching services.

The rule, which is expected to go into effect in six months, does not end rate regulation on New York Telephone, as would the Illinois proposal.

Meanwhile, a bill before Congress would permit the Bell companies to go ahead with their now legal entry in information services only if they unbundled their services, including local dial tone.

Lost in the regulatory rush are some technical questions, such as whether local telephone company services can be properly unbundled as the alternative carriers demand. This is especially complicated with special, point-to-point and switched access services. Unbundled switched access could give alternative carriers a line into all the businesses and homes served by local phone companies today.

Senior Editor Joanie M. Wexler contributed to this story.



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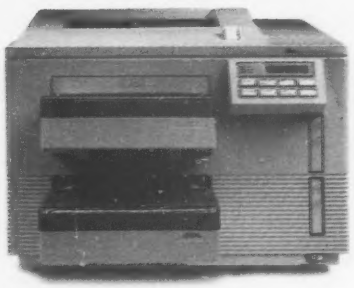
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HEWLETT PACKARD

EMC upgrades 3990-like disk array by 60%

BY PAUL GILLIN
CW STAFF

HOPKINTON, Mass. — Building on what may be only temporary status as the lone player in the market, EMC Corp. will enhance its IBM 3990-compatible redundant arrays of inexpensive disks (RAID) subsystem this week to boost capacity by more than 60%.

A new version of EMC's Symmetrix disk subsystem will pack 40G bytes of storage into less than 6 sq ft of floor space, about 10% to 20% as much space as a comparable IBM setup, according to EMC estimates. Symmetrix uses RAID, a technology that squeezes more storage into less space by spreading data across dozens of inexpensive 5¼-in. disk drives instead of concentrating it on a single large and expensive disk pack. It is compatible with IBM and Unisys mainframes.

Beta-test user JI Case in Racine, Wis., found the new Symmetrix 4832 offered enough response-time benefits to enable the company to defer upgrading its IBM 3090-500J mainframe for six months. The reason was Symmetrix's large amount of cache memory, according to Phil Balcom, manager of information systems planning and technology.

Symmetrix is all alone in the market for 3990-compatible RAID subsystems, while Storage Technology Corp. struggles to get its Iceberg system out the door. Iceberg is expected to be announced this month but will not ship before midyear.

In the meantime, EMC has sold more than 370 of its 4400 series Symmetrix units, which have a list price of $450,000.

The follow-on Symmetrix 4832, which will ship this week, contains 32 disk volumes, compared with 24 in the previous version. At $640,000, its cost per gigabyte is about 15% lower than its 4400 series predecessors. EMC officials said advances in disk density will enable the company to offer a 100G-byte version of Symmetrix by the end of the year, which is comparable to the capacity of IBM's current high-end 3990-3 disk subsystem.

The base Symmetrix unit also includes 768M bytes of cache memory and the ability to cache all data reads and writes. That yields 40% to 60% better performance than a system using IBM 3390 disk drives, according to James Fitzgerald, group product marketing manager for mainframe products.

The major weakness of Symmetrix, Balcom said, is that its controller is currently limited to supporting only the 40G bytes of storage that fit into the Symmetrix unit. An EMC spokesman said the company is working on a way to chain together multiple controllers.

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Intersolv treads on Bachman turf

BY KIM S. NASH
CW STAFF

ROCKVILLE, Md. — Intersolv, Inc. planted a post in re-engineering soil recently by shipping in volume a module for dissecting and redesigning existing Cobol applications.

Design Recovery is a DOS-based program that draws diagrams of data logic, flow and patterns of use underlying MVS Cobol programs. "Design Recovery is a small start against Bachman," said Ian Wickins, supervisor of wholesale systems at Ultramar Canada, Inc.

Intersolv is bucking for a piece of land occupied by Bachman Information Systems, Inc., observers said last week. Both big-name companies provide software to help users analyze and redesign the code of existing systems.

However, Intersolv's product addresses the initial step in re-engineering — documenting the code in existing applications — while Bachman sells an entire workbench for breaking down and recoding programs.

Users were pleased with what Design Recovery can do in that first stage. "It breaks a program down into paragraphs and elements and unreachable code, while Bachman tools concentrate on the straight code logic side, with no pictures," said Wickins, who beta-tests tools from both vendors.

A Bachman spokesman acknowledged that users "will perceive" Intersolv as a Bachman rival because both firms now offer products for cleaning up existing applications. "But we have more experience in re-engineering and more products to back us up," he said.

The decision to break into re-engineering is in keeping with Intersolv's four-part strategy, said Gary Greenfield, vice president of product operations. The strategy calls for Intersolv to address four areas: application redevelopment, software configuration management, code generation and front-end computer-aided software engineering tasks such as analysis and design.

So far, Intersolv has reportedly shipped 90 to 100 copies of Design Recovery, which is priced at $6,500 and runs on IBM Personal Computers and compatibles with DOS 3.3 or higher. The product is targeted for re-engineering IBM MVS Cobol programs.



How Borland's Paradox Is Making News in the USA . . . TODAY

USA TODAY® has changed the way Americans look at newspapers. As "The Nation's Newspaper,"™ *USA TODAY* goes after critical, in-depth stories that affect people across the country.

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USA TODAY's Special Projects Unit has the daunting task of gathering and analyzing various government reports and statistics to get to the important stories hidden underneath.

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Reporters download information—from census figures to campaign finance data to crime statistics—into specially created Paradox databases for easy searching and analysis. In many cases, Paradox imports these figures directly, since it reads dBASE® and Lotus® files.

The S&L Scoop

In fact, Paradox and database journalism were key figures in *USA TODAY*'s groundbreaking series of reports on the Savings & Loan crisis.

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Software Craftsmanship

ADVANCED TECHNOLOGY

TECH TALK

Calling data more compact

■ MCI Communications Corp. plans to start delivering billing data on compact disc to its largest customers of Vnet, a virtual private network service. Eastman Kodak Co. will provide MCI with write-once CD technology that it developed as part of its Photo CD system. MCI said using the CD system will help eliminate reams of computer printout paper and multiple mainframe tapes and allow customers to manage their telecommunications services more effectively. Kodak's Photo CD is capable of storing up to 100 full-color images.

Faster in two directions

■ IBM researchers said recently they have more than tripled the speed of a lateral bipolar transistor that could power high-performance, low-power computers. The transistor, which operates at 20 billion cycles per second, conducts charges horizontally and uses both positively and negatively charged particles to carry electrical current. The researchers said they were able to boost its performance using an innovative lateral design that decreases capacitance and resistance.

New uses for tubes

■ Digital Equipment Corp., Envirocycle, Inc. and Corning, Inc. have announced a unique process for recycling glass from CRTs. The process eliminates the need to bury computer video displays and television sets in increasingly expensive hazardous waste landfills, according to DEC. DEC supplies the CRT glass, Envirocycle processes it using a technology it developed, and Corning uses the crushed glass in manufacturing. Envirocycle said it has hit on a way to recycle the glass and reclaim any materials that might raise environmental concerns. The process can accommodate about 15% recycled material now and is expected to increase, according to DEC.

Multimedia focus turns to training

Employees develop further skills as large corporations see future in high-tech lessons

BY MICHAEL ALEXANDER
CW STAFF

Talk about multimedia has been as lively as the technology itself, but most companies are shying away from developing applications in-house. Several analysts predict that multimedia will not take off in a big way in the corporate world until after the mid-1990s.

The early adopters, however, say the technology can already be put to good use, especially in training employees.

Bethlehem Steel Corp. has been a heavy user of multimedia for the last seven years, said Leon Murphy, manager of the multimedia applications team at Bethlehem Steel in Bethlehem, Pa. The company developed its first interactive videodisc program in 1985 and completed its first major digital video interactive (DVI) application in 1991.

DVI, developed by General Electric Co. and commercialized by Intel Corp., is a compression technology designed to allow personal computers to handle digital audio and video and still images.

Blue-collar program

The company's initial thrust was to train blue-collar workers in the plant on a variety of steel production techniques, Murphy said. The DVI-based application was designed to teach employees at Bethlehem Steel, General Motors Corp.'s Cadillac division and third-party steel processors how to analyze production, inventory and sales statistics to control precisely the availability of different types of steel.

This is a technique called "agile manufacturing," where automotive companies and their suppliers collaborate on the manufacture of goods according to market forces, Murphy said.

Multimedia training has been "extremely cost effective," although it is tricky to quantify results, Murphy said. Of the 5,000 employees who have taken at least one course, training time has been cut by 20% to 40%, and retention rates have risen 20% to 40%, Murphy said.



Joel Nakamura

"One of the key factors is that employees can receive training on demand, any time of the day, or stay after work if they want," Murphy said.

Most of the multimedia development work is taking place in the corporate world by 200 or so early adopters, said Maureen McManus, who follows the multimedia market as a principal at MG Consulting, a market research firm based in Hudson, N.H.

"Right now it is typically the larger corporations that are willing and able to make the investments," McManus said. "It is still out of reach for the typical IT user both in terms of the cost for delivery platforms and also the payback."

Training is the primary multimedia application, followed by the business presentation, McManus said. The use of public access kiosks for point-of-sale and other retail applications is moving up fast, she added.

Last September, Shell Canada Products Ltd. opened the doors of a $15 million Shell Infocentre of Highway 401 outside of Toronto that includes a sophisticated multimedia center in addition to several retail outlets geared to motorists. The Infotouch multimedia center includes seven IBM 8516 touch screens, 12 IBM Model 80s, a Novell, Inc. 386 network and a Pioneer Electronics Corp. "video wall" of 16 television screens.

Infotouch has a dozen categories, including local restaurants, hotels and attractions, explained Darlene Barber, the project manager at the center. Tourists can select a hotel, for example, by geographic location, price and facilities by simply touching a screen, she explained.

Computers running world's largest telescope

BY MICHAEL ALEXANDER
CW STAFF

Astronomers are putting the finishing touches on the W. M. Keck telescope — the world's largest — which they say would have been impossible to create and operate without computer technology.

The $94 million telescope is being built and operated by the California Association for Research in Astronomy — a partnership of the University of California and the California Institute of Technology — near the top of Mauna Kea, a dormant volcano on the island of Hawaii. The telescope uses a unique mirror (33 ft in diameter) that comprises a mosaic of 36 hexagonal segments, each weighing about 1,000 pounds and all designed to work together to create a single smooth reflecting surface.

"We definitely needed a computer to run the telescope," said Jerry Nelson, the project scientist at the W. M. Keck Observatory who first proposed using a segmented mirror.

Precision alignment

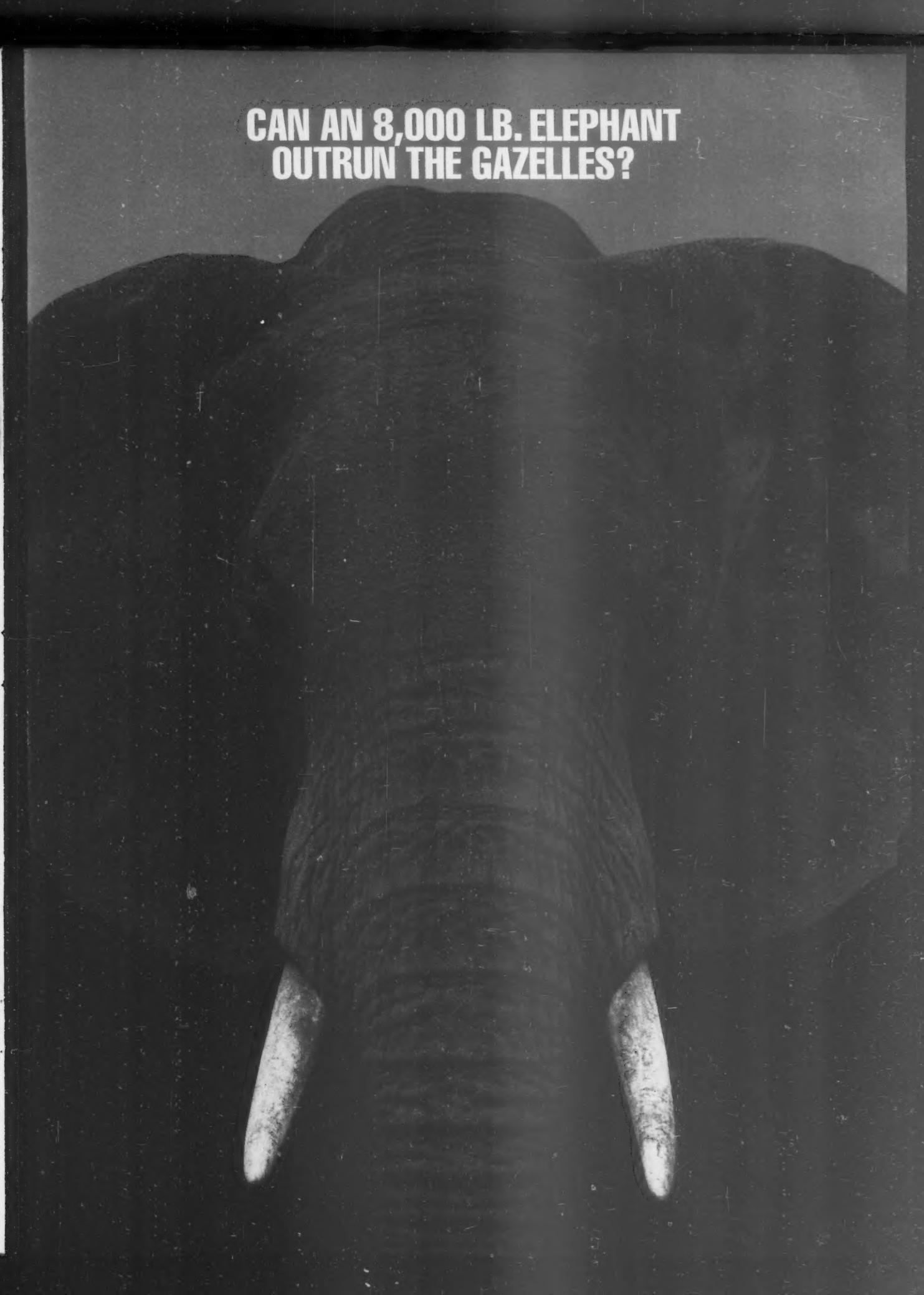
A highly sensitive and reliable computer-controlled system is needed to keep the segments aligned to a precision finer than a millionth of an inch, he said. The mirrors are kept in alignment by a system of 168 sensors and 108 actuators, which are capable of gently nudging each mirror into position. The sensors and actuators for each segment are connected to a network of 12 Motorola, Inc. 68010 and 68020 microprocessors and a Digital Equipment Corp. Microvax.

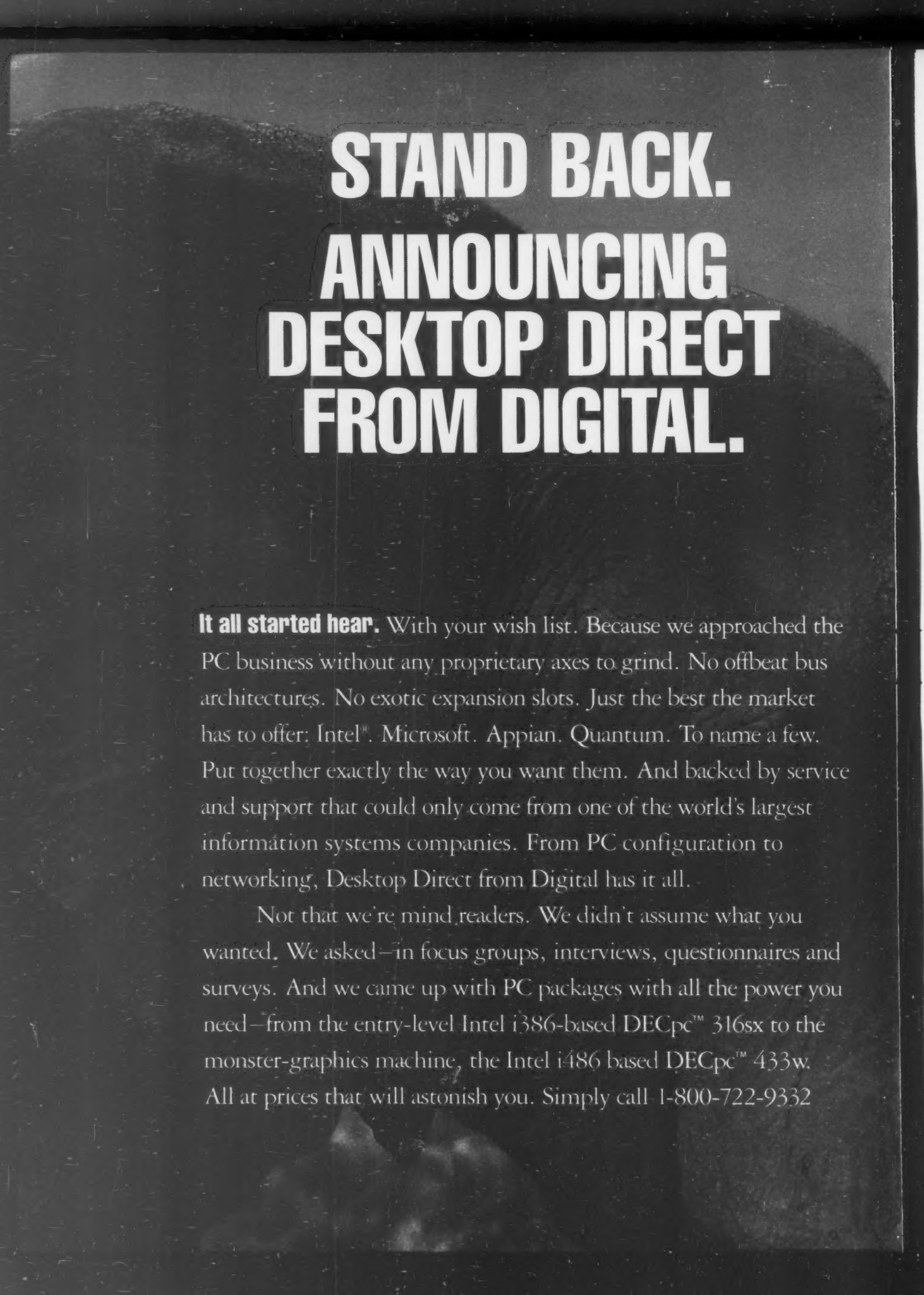
Two microprocessors handle communications and memory management. Nine microprocessors, one for every four mirror segments, transmit the sensor readings to a microprocessor that processes the signals, calculates whatever adjustments are needed and relays the information back to the microprocessors controlling the actuators. The mirror array is updated twice each second.

The Microvax oversees all the elements in the system and collects data on the system's performance so its operation can be evaluated periodically.

"We could have quite easily used one Microvax, but because computers are so cheap, we ended up using nine microprocessors as I/O devices," Nelson said.

The Microvax and microprocessors also communicate via an Ethernet to another Microvax that controls the horizontal and vertical movement of the telescope.


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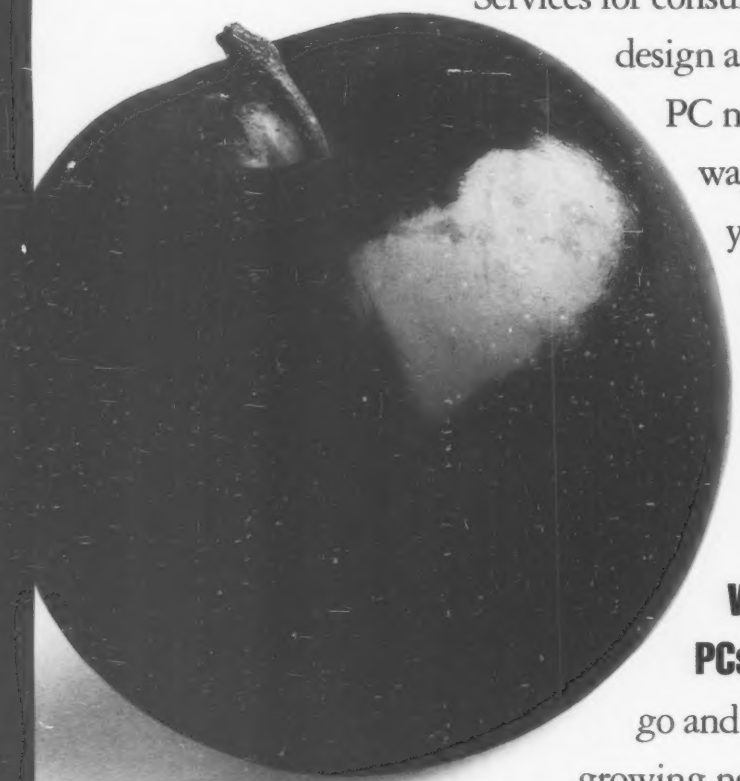


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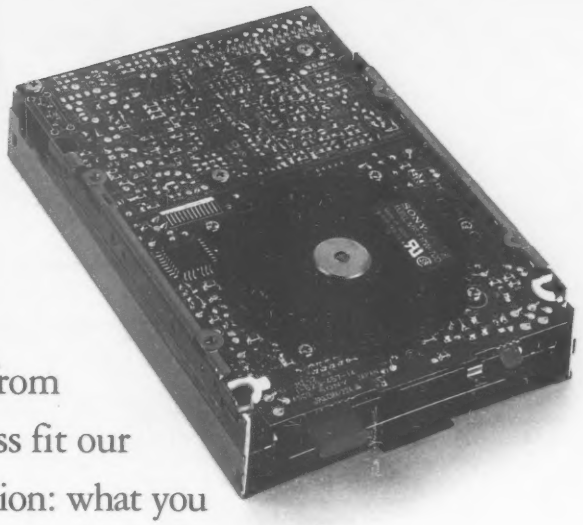
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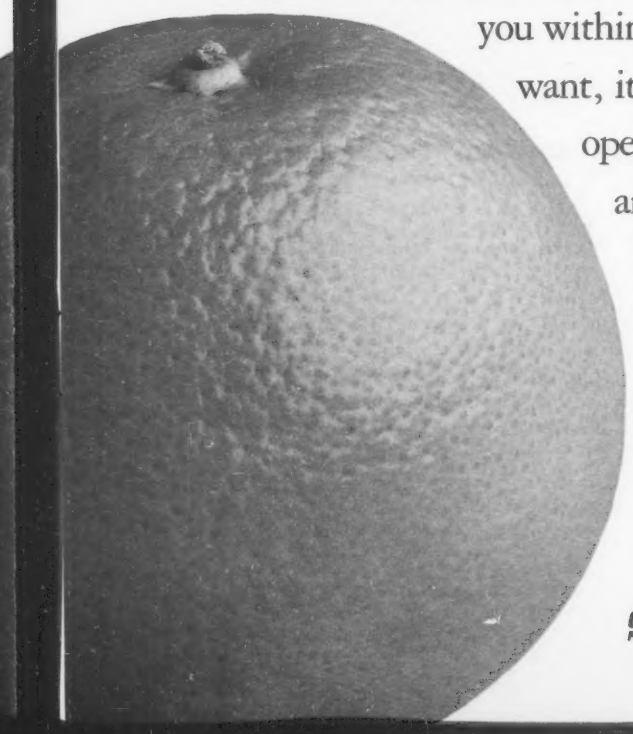


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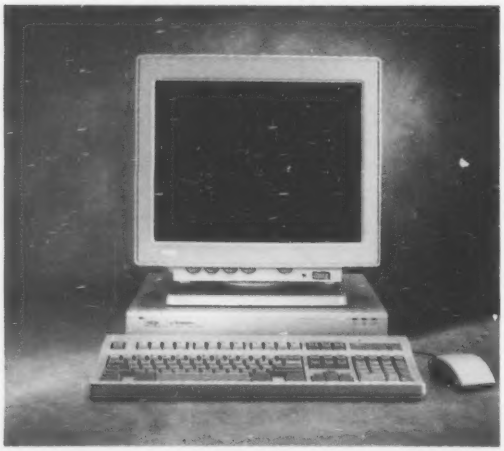


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Mouse:	Two-button Mouse
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0

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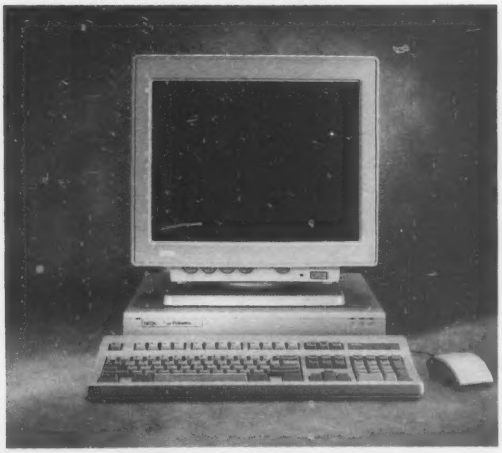


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Microprocessor:	Intel i386 running at 25MHz
Memory:	4MB, 80NS Memory Kit
Storage:	52MB IDE Hard Disk Drive
Resolution Mode:	1024 X 768 SVGA Adapter
Display:	14" VGA Color Monitor
Keyboard:	101-key Keyboard
Mouse:	Two-button Mouse
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0

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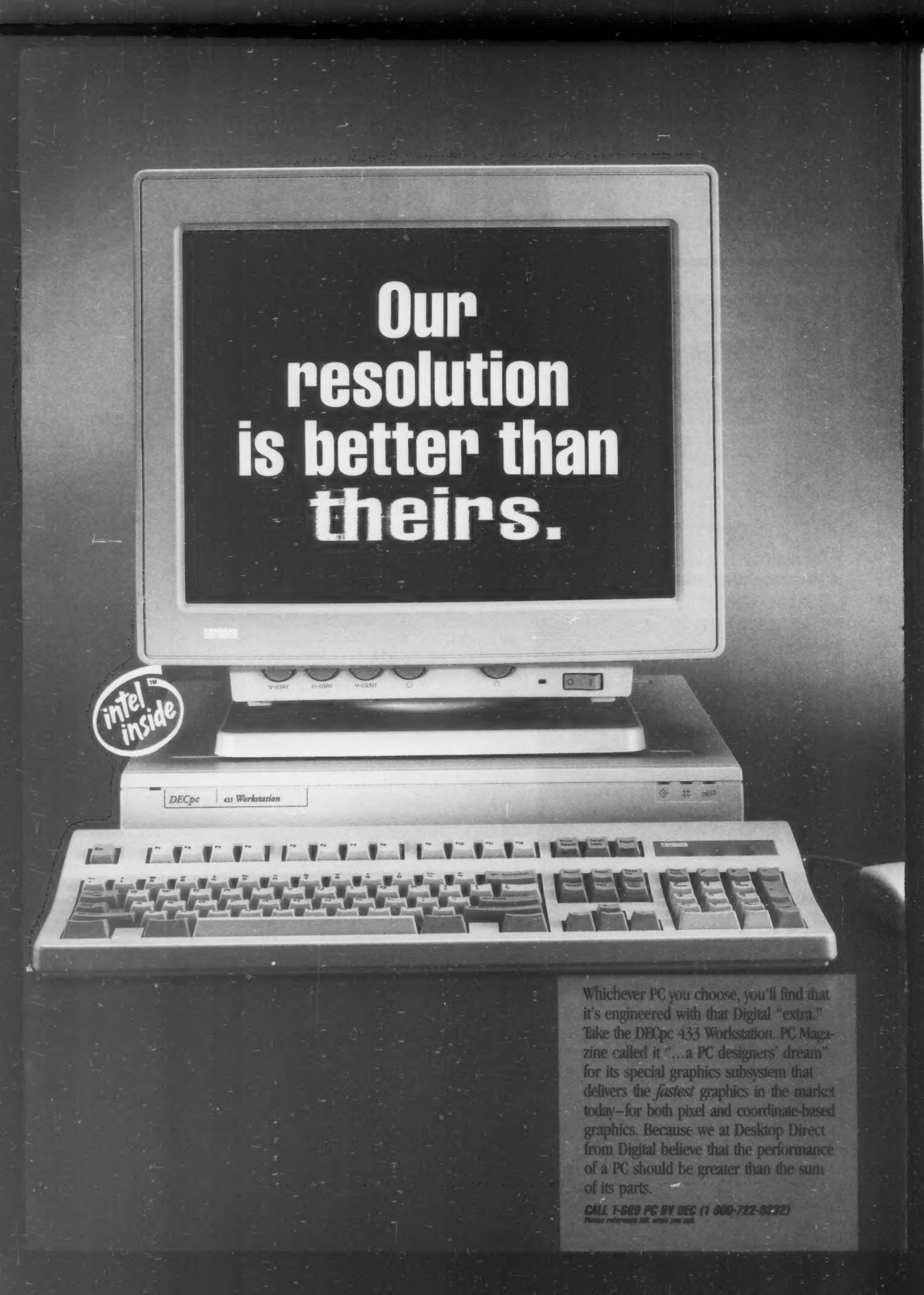
DECpc 433 workstation



Includes:

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Memory:	8MB, 80NS Memory Kit
Storage:	209MB SCSI Hard Disk Drive
Resolution Mode:	1280 X 1024 TIGA Adapter
Display:	20" Color Monitor
Keyboard:	101-key Keyboard
Mouse:	Three-button Logitech Mouse
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0

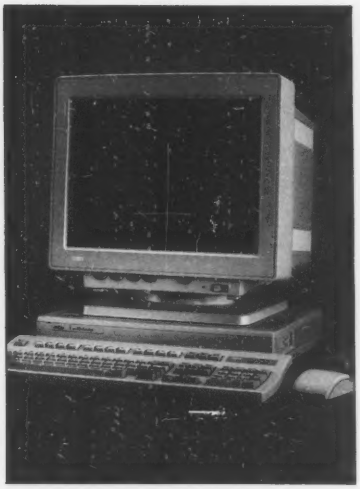
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DECpc 433 Workstation: Recommended Start-Up Configuration. (Details below.)

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With the DECpc 433 in front of them, graphics users will take advantage of industry-standard full-screen VGA displays and workstation quality graphics (1280 X 1024 pixels by 256 colors). And, as the DECpc 433 is compatible with all of Digital's large-screen monitors, users of windowing environments such as Windows 3.0 and Presentation Manager will be able to view and manipulate information in multiple windows *without* sacrificing viewing size or losing content.

Importantly, while the DECpc 433 is optimized as a "network client," we also configured it to run as a *standalone* PC. As such, it supports MS-DOS, OS/2, SCO Open Desktop* and application software; handles more than 1 Gbyte of disk storage; works with your choice of high-quality tape backup units; and allows users to achieve workstation-class performance for MS-DOS and OS/2 applications.

DECpc 433 Workstation. System Configurations

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What best describes the type of work the system will be used for? (Check all that apply):

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☐ Order-entry ☐ Education ☐ Software Development
☐ Database (filing records) ☐ Design (CAD/CAM) ☐ E-Mail
☐ Financial Calculations ☐ Engineering ☐ Other industry-specific
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EDITORIAL

Don't quota me

President Bush's eventful trip to Japan last week has many people thinking as much as ever about what the government's role should be in fostering our economic health in a global marketplace.

Most of the attention was focused on Bush's ability to help the U.S. automakers. The tactic? Slow or reverse the growth of Japanese exports to the U.S. while allowing a trickle of U.S.-made cars into Japan.

Let's remember what happened a decade ago. Alarmed at the increase in Japanese car sales in the U.S., the Reagan administration pressured the Japanese into "voluntary" quotas. Absent some competition from abroad, U.S. carmakers saw their profits soar. They responded by buying up their own stock and handing top executives sinful compensation packages, all the while doing painfully little to improve quality. In other words, the consumer got screwed by paying higher prices — but not for a better car — while having less choice.

While U.S. carmakers may have had their day in the sun, the information technology vendors here enjoy a position of world leadership. They attained that position with just one chief source of government help: the flood of aid to higher education, especially technical education, that trained the scientists and engineers who later founded our great computer companies. The rest, the companies did on their own.

So rather than stating what the government should do to help preserve our leadership in computer technology, let's consider what it *shouldn't* do.

• *Give direct aid to the development of specific technologies, such as supercomputing or VLSI.* This implies that somehow the government is better at allocating research and development funds than the market is. Remember that it wasn't that long ago that we heard so much clamoring for public support of HDTV initiatives. HDTV today is a sinkhole into which the Japanese have poured good money for naught.

• *Impose more quotas and tariffs on foreign high-tech equipment.* Today, the only competition for IBM-compatible mainframes comes from wholly Japanese-owned Hitachi Data Systems and from 49% Japanese-owned Amdahl. Where would consumers be without vendor competition? Remember what happened in the auto industry.

• *Do nothing to change the rules that allowed corporate raiders to destroy so many companies in the 1980s while making a handful of investors and lawyers shamefully rich.* Actually, there was a better piece of advice put forth by Franklin Roosevelt 50 years ago: "We must especially beware of that small group of selfish men who would clip the wings of the American eaglet to feather their own nests."

Bill Laberis

Bill Laberis, *Editor in Chief*



LETTERS TO THE EDITOR

More questions

Regarding "Users urged to examine CASE prior to purchase" [CW, Nov. 18], there are two questions customers should ask before investing in computer-aided software engineering (CASE) products:

"Does the CASE tool support development of cooperative processing applications?"

"Does the CASE tool offer a migration path to cooperative processing and other future environments?"

Widespread implementation of cooperative processing technology will be realized only with CASE tools that support open, heterogeneous environments. Organizations need to know that the investment they make today will be protected as they move to new environments in the future.

Glover Ferguson
Andersen Consulting
Chicago

Still unemployed

The statements in "Metropolitan New York tough job market to crack" [CW, Nov. 18] that recent college graduates may not have as hard a time finding information systems employment in that area and that "entry level is the brightest spot" are both inaccurate and ludicrous.

I received my master's degree in computer and information science from Brooklyn College in February 1990. I have yet to find employment. I haven't had an interview in more than a year. I think the last interview I had was with a city agency, and I was one of 10 people they picked to interview from more than 500 resumes.

The statement that "they work cheaply" really bugs me. Recent graduates may be willing to work for some cheapo outfit so they can gain some experience and hopefully get a decent job, but college costs a lot of money, and people aren't going to spend the money on a college education if they can make more money delivering pizza.

So if corporations think they can take advantage of grads, eventually that strategy will backfire, and in a few years' time they will be crying, "I can't hire anyone who can speak English."

Richard Fennimore
Brooklyn, N.Y.

'Deadbeat' dads phrase offensive

Regarding the article in your Dec. 2 issue, "Computers crack down on child support," there are flagrant biases that permeate the piece.

The phrase "deadbeat dads" is offensive to me. Perhaps you were just parroting the self-serving, inflammatory rhetoric the child support industry promotes instead of looking into the facts available from other sources.

The problems with child support administration are anchored deep in the swamp of the adversarial court system. Use of inflammatory phrases such as "deadbeat dads" only serves to prevent a clear, open discussion leading to working solutions of the real problem.

Fair, equitable and enforceable "awards" of custody, support and visitation can minimize the occurrence of "deadbeat" parents and provide the children with what they truly need: a caring relationship with an out-of-home yet nurturing parent.

Gene P. Fidler
Novi, Mich.

A consumer rip-off

My eyes nearly popped out of my head while reading the Dec. 16 article, "Apple stocking anti-piracy ammunition."

I don't condone piracy of software, but I also believe *Computerworld* does not adequately cover the complaints against software companies' licensing, pricing and update practices.

Most of their pricing structures are rip-offs of the consumer, especially the costs to add more users. The disks the software resides on are subject to failure. The replacement policies are too expensive. Much of the software is on the market for a very short period of time.

I once bought entertainment software that I wanted but knew I would not use for some time. I tested the software when I bought it, and it worked. When I went to play it six months later, it would not load. The warranty had expired. If it had not been copy protected, I would have made a backup.

You are right: Piracy is wrong. But I can't help but believe that if pricing were more consistently fair, copy protection eliminated and a concerted effort made to educate users, software sales would skyrocket.

Gordon Johnson
Grand Rapids, Mich.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor in Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

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R&D: The Washington equation

KENNETH R. KAY



Success, particularly in Washington, D.C., is often measured against expectations. As a result, the national political community and the research and development community may be at odds over whether recent congressional action to temporarily extend two important R&D provisions — the R&D tax credit and the moratorium on the Section 861-8 research allocation rules — is a success.

Based on the expectation that the provisions would expire, Congress and the administration may consider the extensions a success. Just two weeks before the end of the congressional session, astute political pundits would have given the provisions only a 10% chance of being extended. Against a backdrop of fiscal contraints and end-of-session legislative wrangles, the mere fact that these provisions survived is significant.

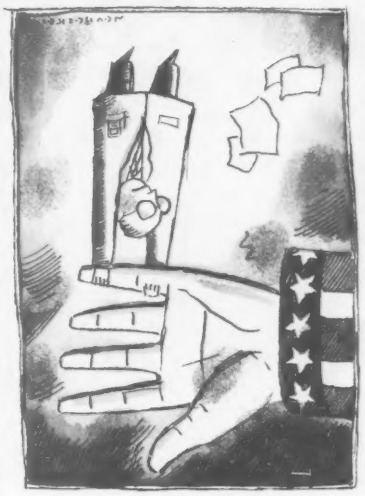
In light of the need for permanent, stable R&D provisions, however, the research community does not consider the six-month extensions a success.

The R&D tax credit, orginally enacted in 1981, provides an incentive for firms to increase spending on R&D. It has been estimated that if the R&D tax credit were permanent, it could increase R&D spending by $25.7 million between 1991 and 1995. In addition to the research benefits, this would have a ripple effect on jobs, local economies and businesses.

Section 861-8, as it applies to research, is an onerous provision requiring U.S. firms with foreign operations to allocate a percentage of their R&D expenditures to income earned abroad. In effect, it is a disincentive to conducting R&D here at home, which is one reason why Congress has, for years, enacted moratoria to prevent it from taking effect.

While the temporary extensions have been helpful, they do not constitute effective or efficient public policy. To be most effective, our national R&D policy needs to better correspond to the true nature of the R&D enterprise. R&D projects generally span an average of eight to 10 years, so to get maximum benefit, R&D policies must be consistent over time.

For years, a wide range of industries have advocated a permanent R&D tax credit and moratorium on Section 861-8. For almost a decade, bills to make both provisions permanent have received substantial support in both houses of Congress. Moreover, successive administrations, including the current Bush administration, have backed permanent provisions. Nevertheless, the outcome has always been temporary extensions.



Robert Neubecker

There are some encouraging signs that 1992 may finally produce success. During the recent deliberations, Dan Rostenkowski (D-Ill.), chairman of the House Ways and Means Committee, made it clear that the pattern of temporary extensions would have to come to an end and Congress would have to vote up or down, once and for all. A series of hearings has been set for Jan. 28 and 29.

Second, as the country readies itself for a presidential election, there seems to be a genuine momentum building for an economic growth package designed to invigorate the economy. To date, the R&D provisions have received significant attention as these growth packages are being assembled.

Despite these positive signs, however, there is still no guarantee.

The challenge for the coming year is clear. Industry must articulate the value of R&D, not only to individual companies and industries, but to the country as a whole. Further, we must convince Congress and the administration to separate action on the these provisions from the highly contentious, politically charged debates that are sure to continue.

Finally, we must all remember that the goal is permanence. Only when that is accomplished can success be claimed.

Kay is executive director of the Council on Research and Technology, a coalition of over 125 research-intensive companies, universities, trade associations and research institutes.

Object orientation not cure for IS headaches

MARTIN A. GOETZ



Object-oriented programming (OOP) may have reached its highest level of hype with *Business Week*'s September cover story, "Software made simple."

The story's tag line, "It's called object-oriented programming — a way to make computers a lot easier to use . . . " was an example of the kind of overstatement that IS managers have heard time and again, describing a parade of cure-alls for the high cost and effort of software development.

While each of the hoped-for solutions has contributed to improving the state of the art, none has ever lived up to its original promise. The programming backlog is still with us and as large as ever. And so is the invisible backlog — those requests that are not even considered because of the huge queue in front.

OOP won't fare any better. It too will fail to meet the expectations of the IS community.

The search for "software (or programming) made simple" is an idealistic and laudable goal. But the fact is that it just isn't going to a happen . . . at least not in our lifetime.

The truth is that building major applications remains a time-consuming and laborious process. Data used by the functions of an application must be classified, organized, represented and defined in ways that are unique for every organization because data organization and processing logic are not transferable from one place to another.

There is no evidence that OOP will change this. Further, there is a strong argument suggesting that companies buying into OOP in the hopes that it will make their organizations more effective may, at the very least, be in for a rude awakening and could be seriously jeopardizing their ability to build and maintain major applications. Here's why:

• **Massive analysis task.** One of the basic claims of OOP is that it will permit the reuse of code, thereby reducing redundancy and the need for reinvention of the wheel. But, to develop reusable code, OOP proponents admit that the corporation must undergo enterprise analysis starting at the top and analyzing all of the applications that will be built, the objects and entities within the corporation, the characteristics of the objects and how the objects interact or might be used in any future applications.

That's a tall order to say the least. A firm overwhelmed by that prospect might elect to look only at a smaller number of applications.

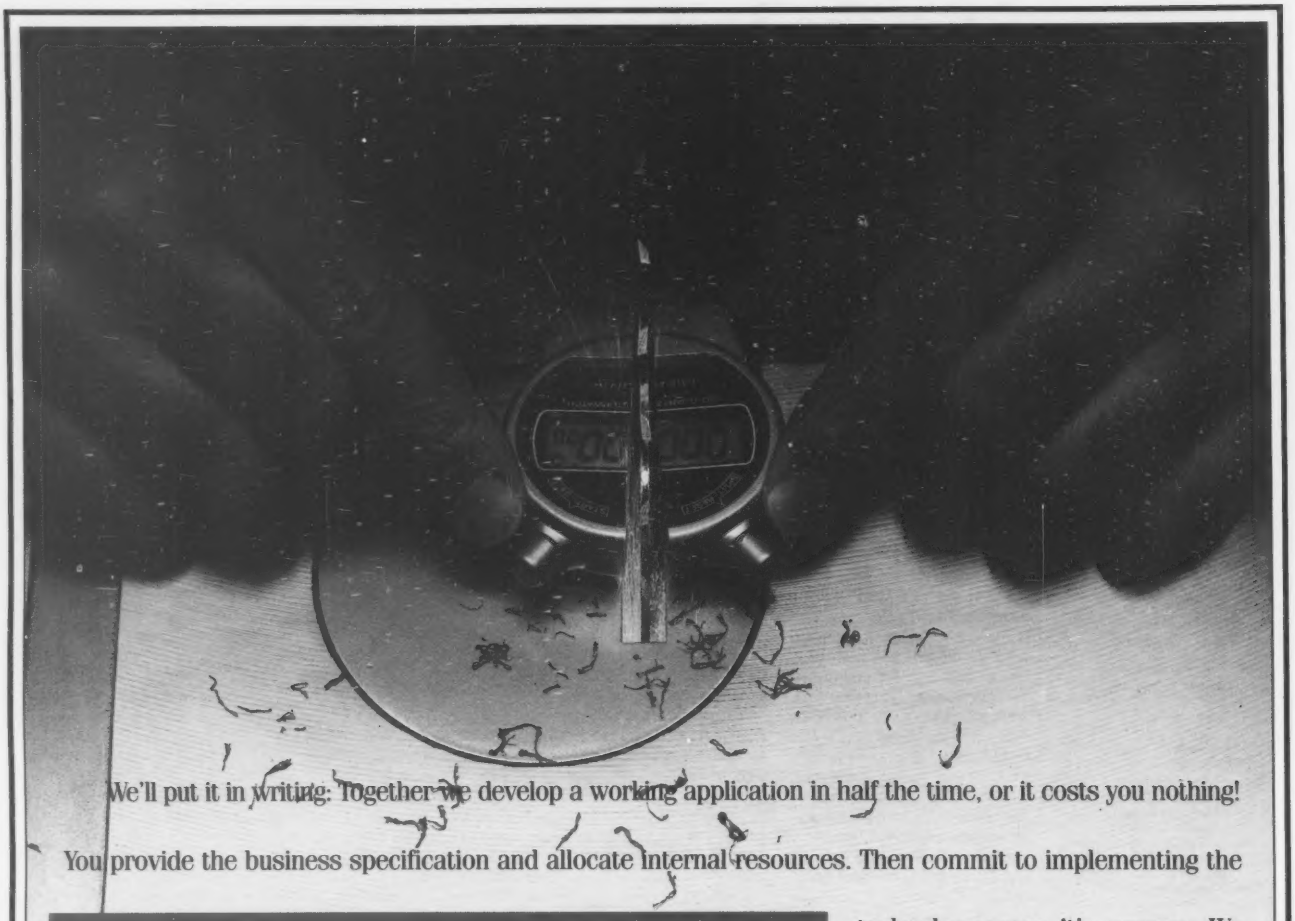
• **Maintaining purity is hard.** Even supposing that your business is "different" and that you can develop or already have hundreds or thousands of these encapsulated objects, you still aren't home free. As objects become more and more complicated (and they eventually will), it will be virtually impossible to keep these objects so pure that "maintenance" or "change" to the one will not affect an application that uses it.

• **Objects require upkeep.** Objects are parts of classes, and they have properties that change through inheritance, demons and so on. But who is going to build and maintain these changeable or dynamic objects? When they change, who is going to ensure that they still operate correctly and efficiently in a production application? So-called "smart" objects will only be smart if there is a cadre of highly experienced professionals who have the expertise and intuition to build and maintain them.

Regardless of the belief and the commitment to the promise of OOP, it will fail in most IS organizations simply because OOP will require a new way of looking at building applications. The discipline, the number of personnel and the training that are required all contribute to the likelihood of failure.

IS organizations that want to improve their productivity have better alternatives, including the use of high-level, fourth-generation languages, CASE tools and code generators.

Goetz is president of Goetz Associates, a management consulting firm in Teaneck, N.J., and founder of Applied Data Research.



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SOFTWARE SHORTS

NCR users join the CASE race

NCR Corp. System 3000 users will be able to join the CASE race. NCR announced that **LBMS, Inc.** in Houston will port LBMS I-CASE, an integrated computer-aided software engineering (CASE) tool set, to System 3000 workstations. This is reportedly the first CASE product available for the platform.

In the first of a series of software porting plans set for 1992, **Wavetracer, Inc.** said it will port its Multi C programming language to the IBM RISC System/6000 workstations and servers. Programmers will be able to use Multi C to develop applications that transparently combine the RS/6000 environment with Wavetracer's three-dimensional, massively parallel architecture. The Acton, Mass.-based vendor also said it raised $6.5 million in a second round of financing that includes **Perot Investments, Inc.** and **Banc Boston Ventures.**

Must Software International has moved to produce and distribute a Japanese version of its Nomad fourth-generation language and database management system. Must signed a contract with **Suntory Ltd.** in Japan, under which Suntory will sell the English-language version of Nomad and a newly developed Japanese version.

Unisys Corp. has announced plans to work with **Littlewood, Shain & Co.** to provide specialized consulting services to financial institutions interested in Unisys' check imaging technology. Littlewood, Shain will work with Unisys to develop business case analyses for imaging projects and help financial institutions develop strategies for float and deposit products.

Client/server CASE in '92

BY KIM S. NASH
CW STAFF

The hoo-ha has begun. With 1992 deemed the "Year of Client/Server" by at least one analyst, CASE vendors are hyping development tools for building cooperative applications.

But users, once burned by unmet promises of the first-generation computer-aided software engineering (CASE) products, are twice shy about the prospect of a second wave of tools touting buzzwords.



We like the idea, but the current offerings are weak, most users said.

"It's hard to tell whether a new product can actually help with client/server development or whether it's a simple interface builder," said David Baird, an applications development programmer at Depository Trust Co. in New York.

The Trust is exploring client/server computing for implementation in the next few years, according to Baird, who has used Advanced Development Workbench (ADW), Knowledgeware, Inc.'s integrated CASE suite, since 1989.

Dozens of small CASE companies and most of the major ones have released graphical user interface (GUI) builders in recent months. The general hype says GUI makers give a client/server feel to host-based applications.

"That, of course, is not client/server computing," said James Martin, CASE consultant and president of James Martin Associates in Chicago.

GUI tack-ons simply add desktop style to mainframe- or minicomputer-based systems, he said. The products do nothing to automatically dole out processing tasks to the machine best suited to handle them.

But that essential ingredient is still missing from current CASE offerings, said Aaron Zornes, vice president of applications development strategies at Meta Group, Inc., a market researcher in Westport, Conn.

A couple of trends are expected to gel in 1992 to make way for client/server application development tools, according to Frank Gens, vice president of Technology Investment Strategies Corp. (TISC).

Most important is swelling

Continued on page 37

Informix brings Version 5.0 Online

BY JEAN S. BOZMAN
CW STAFF

MENLO PARK, Calif. — Informix Software, Inc. is officially launching a new version of its Online relational database management system, Informix Online 5.0, this week. As expected, the software brings Informix's database features into parity with rival products from Oracle Corp., Ask Computer Systems, Inc.'s Ingres Products Division and Sybase, Inc. [CW, Oct. 28].

Informix Online 5.0's enhancements include support for distributed updates and two-phase commit, support for optical disc storage of images, support for transaction processing managers such as AT&T's Tuxedo and support for stored procedures. The software is compatible with the ANSI SQL-89

Continued on page 37

Commercial applications on the rise at VAX sites

BY SALLY CUSACK
CW STAFF

A recent study revealed that half of the application installations planned for 1992 within the Digital Equipment Corp. VAX user community will be for commercial computing purposes rather than scientific or engineering uses.

According to a recent report from Computer Intelligence (CI), a market research firm based in La Jolla, Calif., commercial applications now represent almost half (48%) of the applications being planned for VAX and Microvax systems. This is a flip-flop from the previous decade, when DEC made the vast majority of its money selling into the scientific and engineering community.

The CI study, based on interviews with officials at 9,000 VAX and Microvax sites and 3,000 DEC workstation sites, found that engineering and scientific applications represent 16% of planned applications for VAX and Microvax systems. At VAX and Microvax sites, only 22% of planned applications will be installed on a VAX or Microvax, while almost a third (32%) will be run on a local-area network, the report said.

David Eulitt, midrange industry analyst at CI, pointed out that if a user is planning to run his new application on a LAN, it does not necessarily mean that the VAX system will not be used as a file server or an application server.

"It may simply indicate that industries are either downsizing or simply trying to provide more of a client/server focus," he said.

One DEC user, David J. Foss, section leader of the computer science department at Glidden Paint Research Center in Strongville, Ohio, said his company will continue to do internal development based on need, but future installations of both scientific and commercial applications will depend primarily on what packages and programs will be available in off-the-shelf versions, as opposed to any particular hardware platform.

Glidden has a large DEC network that includes a VAX 6000 Model 400, a Microvax II, a Microvax 2000 and a Vaxstation 2000. The company has also installed two Sun Microsystems, Inc. Sparcstations. There are approximately 200 end users on the network.

"What has happened at our site is that we originally brought in the DEC computers for scientific applications, but we have been introducing word processing and spreadsheet programs along with the personal computers," said Foss, adding that Glidden has been a DEC shop for almost 15 years.

Gary Sutton, senior systems analyst at Kerr-McGee Corp., a petroleum and energy firm in Oklahoma City, said the company is not planning any major software installations in the near future. He noted that Kerr-McGee is trying to hold down development costs during the recession.

But their future VAX systems could be in the form of a server on the network, Sutton said.

Kerr-McGee currently has a Vaxcluster running both scientific and commercial applications, as well as several Decstations, Vaxstations and IBM RISC System/6000 workstations for scientific applications.

The CI report also shows that 45% of planned applications installations for the DEC workstation market segment are scientific and engineering applications.

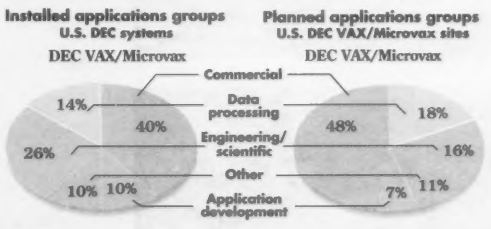
At DEC workstation sites, planned application use is split fairly evenly among LANs (18%), VAX/Microvaxes (23%), DEC workstations (25%) and non-DEC workstations (24%).

The distressing news for DEC may be that the study shows that 22% of the planned applications at VAX and Microvax sites are slated for non-DEC workstations, such as those from Sun, Hewlett-Packard Co. and IBM.

The IBM and plug-compatible mainframes also account for a respectable share of the planned applications, representing 9% at the VAX/Microvax sites and 6% at the DEC workstation sites.

Commercial world

The DEC user base expects to increase its orientation toward commercial processing



Source: Computer Intelligence

CW Chart: Michael Siggins

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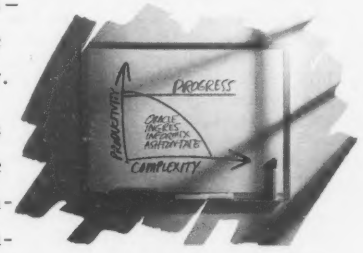




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CPWADV0113

Coke plans to add life with relational database move

ON SITE

BY JEAN S. BOZMAN
CW STAFF

GREENWICH, Conn. — Coca-Cola Bottling Co. of New York, Inc. has a plan for the year 2000: It is slowly but surely migrating its financial applications to a relational database to save on processing time and to get a clear picture of how Coke cans are stacking up on grocers' shelves.

The $600 million regional bottling operation is updating its applications as part of a new information systems framework that will take operations out of an era of overnight batch-processing and computer printouts — and into an era of leading-edge on-line systems, said Joseph Calo, the firm's MIS director. Dozens of custom applications will be rewritten during the next five years. But the first steps were taken in April 1990, when the 3,000-employee company installed an Oracle Corp. relational database on its IBM 3090 mainframe.

Since the Oracle database was installed, processing time during some monthly book-closing operations has fallen from 12 hours to just three hours, and users now have the option of doing ad hoc reports whenever they want them. "We have 750,000 rows of data in our Oracle database," said Ronald Drew, manager of systems development, "but now I can find a single journal entry in 10 seconds. Before this, a search like that used to take half an hour."

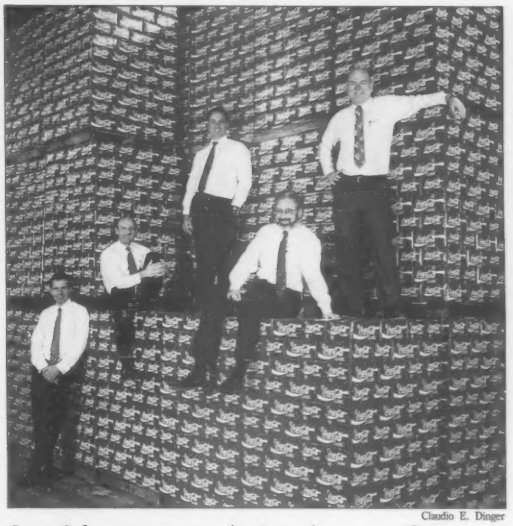
Development times have also been shortened. "If we had to write our own payroll and HR applications, we never could have done it in nine months," said database administrator Thomas Bellavia. However, Coca-Cola programmers had to modify the packaged Oracle code. The primary tools used were Oracle's Application Foundation, the Oracle SQL*Forms application developer and the SQL*Report report writer.

The new wave

After a year of planning, the bottling firm went into production with its first wave of Oracle Corp.'s financial application packages on Jan. 1, 1991. The general ledger package came on-line first, followed by a human resources package in September and accounts payable in November. All told, about 150 users access the Oracle packages — not nearly as many as the hundreds of employees who log on to hundreds of older applications running under IBM's VM.

The three Oracle applications will complement older financial packages, such as a Dun & Bradstreet Software payroll package. The payroll program runs under IBM's DOS/VSE, which runs as a "guest" under IBM's VM. Coca-Cola had to knit the old systems with the new, writing programs that transfer data records from IBM VSAM files to the Oracle database tables. The new Oracle financial systems ran alongside older applications for two months before they went into full Oracle production, Drew said.

The migration to a relational database system was made to avoid the installation of IBM's CICS on-line transaction monitor and the MVS operating system. "We went from a Ford Model T to a brand-new Corvette Stingray, and we didn't take any intermediate steps," Bellavia said. "We entered into an agreement with all the vendors involved that if we couldn't get this to work, we were going to scrap the entire project." Sometimes, all the vendor representatives sat in the same room, trying to iron out incompatibilities between their products.



Claudio E. Dinger

Coca-Cola *managers are implementing a new IS framework that will take operations to the leading edge*

A client/server approach was used to overcome a daunting obstacle: The Oracle applications were not designed to run under the mainframe's VM operating system. The Oracle 6.0 relational database management system was installed on the IBM mainframe "server" — then the Oracle applications and a database directory were installed on a "client" Digital Equipment Corp. VAX 3800 the firm already owned. Initially, Oracle's SQL*Net had trouble maintaining a clear connection on the Transmission Control Protocol/Internet Protocol network between the IBM host and the DEC VAX, Drew said, partly because a default memory limit had been exceeded.

Microvax on the move

Besides the architectural problems, there were logistical problems as well. In the middle of the software conversion, Coca-Cola's data center was moved from a New York City location to a suburban site in Elmsford, N.Y. — more than 20 miles away. And, while IBM moved the firm's 3090 mainframe, Drew packed the small Microvax 3800 into his Ford Bronco truck and drove north.

The Coca-Cola framework will not be finished anytime soon. Even though the firm plans to convert one more application to the Oracle RDBMS every three months, it will take many years to complete the task. Coca- Cola will continue to merge the data from its relational and nonrelational database systems for the foreseeable future.

NEW DEALS

French bank picks A series

Unisys Corp. recently finished installing its first A series mainframe at Caisse Reg du Credit Agricole, a French banking conglomerate. Unisys said it has booked $200 million worth of orders for the Model A19, which is at the high end of a line comparable to IBM's Enterprise System/9000 family. Blue Cross/Blue Shield of North Dakota and Advance Bank of Australia have reportedly placed orders for the machine.

Two large grocery chains have installed electronic funds transfer systems from **Stratus Computer, Inc.** Spartan Stores, Inc., in Grand Rapids, Mich., and Giant Eagle, Inc., based in Pittsburgh, have gone live with the systems in several of their 630 stores, with plans for further rollouts this year.

Lawson Associates, Inc. recently sold accounting, human resources and office productivity packages to Tenneco Minerals Co. in Lakewood, Colo. Tenneco Minerals is a $100 million industrial mining subsidiary of Tenneco, Inc. The company plans to run the Lawson software over a network served by two Decsystem 5500s and a Decstation 3100 from Digital Equipment Corp.

Bavarian Motor Works, based in Munich, plans to install an NCube 2 supercomputer from **NCube Corp.** for use in car design. This is reportedly the first time a massively parallel computer using off-the-shelf applications will be used in a full-production environment. Traditionally, massively parallel computing has been done with proprietary software only.

DB2 downsizing less daunting with Snapshot

BY JOHANNA AMBROSIO
CW STAFF

A tool from Bridge Technology, Inc. helps simplify the Herculean task of moving DB2 data from the mainframe to a smaller platform, users have found.

The product, Snapshot, allows data administrators to define a subset of DB2 data, an interval to automatically refresh the data and a target OS/2 server. Snapshot generates the data subset at the required intervals, compresses the data and translates it from DB2 to OS/2 formats. The server actually handles the query processing, thus saving mainframe cycles.

Maryland Casualty Co., an insurance company in Baltimore, has been using Snapshot since mid-November to download about 1G byte worth of personal insurance data each month for an executive support system.

"Before Snapshot, we were using [IBM's] Query Management Facility," which required a lot of manual intervention to create the data set and move it from the 3090 to the server, said Buck Lutman, a technical consultant. "I had to start the job and kind of sit there while it ran."

With Snapshot, he said, the data subset is moved from the mainframe "unattended and automated. It saves me hours and money because the data transfer is faster than with the old system, and it requires fewer CPU cycles." He estimated the product will pay back its approximate $20,000 cost within six months.

Test run at Nynex

In Boston, Nynex Corp. has been testing Snapshot for a few months with two applications, although the company has not yet purchased the product. "We're waiting for funding for the projects," said Peter Schuchard, associate director of database administration. "One of the applications we're hoping to do something with involves personnel, and they've been busy." The company is in the midst of management layoffs [CW, Dec. 2, 1991]. He said the current plan is for the projects to be on track by the middle of the year.

Schuchard said the downsized data will allow user departments to save on monthly mainframe chargeback costs. "We want to find out what we can bring down, what it will cost and whether we will have to write a lot of new code to do it. You can't bring everything down; there just isn't enough DASD in the world to do that." He said that early tests so far indicate the need for an approximately threefold increase in the amount of server storage.

Prices for Snapshot begin at $7,500 and include a server component and a host component. The server component runs under OS/2 Presentation Manager.

Snapshot, Bridge's first product, is used by three companies, said Gregory Ware, Bridge's president. The company was founded 18 months ago.



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Client/server CASE in '92

CONTINUED FROM PAGE 33

economic and political pressure within information systems departments to ditch proprietary systems in favor of some version of Unix and/or local-area network-based environments, he said. Also, software for managing a client/server setup will become available in 1992, addressing such issues as security and backup.

However, either or maybe both of the top CASE suppliers — Texas Instruments, Inc. and Knowledgeware — will ultimately fail to make the client/server leap, TISC predicted in a recent crystal ball report for the new year.

TI and Knowledgeware, along with rivals Intersolv, Inc., Andersen Consulting and CGI Systems, Inc., have each either promised or made available GUI builders. But not all the integrated CASE companies have clear client/server development directions, users said.

Massmutual Life Insurance Co. is in the process of moving development from an IBM MVS mainframe to a LAN, according to Mike Garber, associate director for consulting and support services.

The Springfield, Mass.-based insurer is a TI "Champion," meaning Massmutual is one of TI's 15 biggest users and as such, influences the direction of TI's new products.

Massmutual has not made a decision about client/server development, in part because the quality of TI's and other vendors' client/server tools "just isn't there yet," Garber said.

The same story holds at Whirlpool Corp., which is a big Knowledgeware user.

Although the Southfield, Mich.-based appliance maker has yet to produce a distributed application, "our client/server needs will grow" in the near future, according to Dick Bohanek, senior systems analyst in the Software Engineering & Development Support Group.

In late 1990, Whirlpool chose Knowledgeware tools, in part for their "client expertise," Bohanek said.

He said ADW will let Whirlpool implement client/server software development gradually. ADW is client-driven, according to Bohanek, which means it "isn't oriented to big hardware. It'll be easier to develop client/server applications with tools that are themselves on small platforms," he said.

Informix Version 5.0

FROM PAGE 33

standard. In addition, the first elements of a new multithreaded architecture that will support parallel data query were introduced but only for Sequent Computer Systems, Inc. machines.

Industry analysts said the new features were the result of several years of research and development, which sapped profits at the $146 million vendor last year. "There are still a couple of things they need to get caught up on," said Donald Feinberg, a senior software analyst at the Gartner Group, Inc. "But now they will be better able to compete with the Oracles and Sybases of the world."

Informix will continue to sell the older Informix-SE relational database for packaged, low-end Unix applications.

One early user of the Informix 5.0 software, Rory Martin at Intelus Corp. in Rockville, Md., used it on a Sun Microsystems, Inc. workstation for two months last fall.

"Using the stored procedures, we were able to get around a lot of the memory constraints of our DOS-based clients," said Martin, a technical analyst. "We were able to store complicated SQL statements in the database server itself, without having to store them in the client applications."

Martin reported no major problems with the software, which he said he would prefer to use on his firm's AT&T 3B2 computers.



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Intercim Corp. has ported its Factorynet I/S factory-floor information management system to Unix.

Factorynet I/S functions include shop-floor graphics and instructions, notification services, machine monitoring and distributed numerical control.

Pricing starts at $5,500 for one user.

Intercim also announced two real-time quality management software systems for Unix. Factorynet Q/S monitors manufacturing processes and provides alarms when user-defined analysis threshholds are violated.

Factorynet Q/Trace tracks, reports and analyzes product attribute information by serial or work number.

Intercim
501 E. Highway 13
Minneapolis, Minn. 55337
(612) 894-9010

Computer-aided software engineering

Encore Computer Corp. has announced Parasight, a computer-aided software engineering tool for parallel and multiprocessing environments.

Parasight provides the programmer with a menuing interface and debugging tools. It analyzes program structures and offers a graphical display of executing code. The software runs on the company's Encore 90 family of reduced instruction set computing systems.

It costs $2,000 per user.

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6901 W. Sunrise Blvd.
Fort Lauderdale, Fla. 33313
(305) 587-2900

Utilities

Programart Corp. has announced the availability of Strobe Release 8.5.

Strobe is an application performance measurement utility for IBM mainframes. The new version allows users to pinpoint the specific parts of an application that are consuming system resources.

It also includes new report forms for CICS and IDMS applications. Strobe works with both on-line and batch applications.

Pricing for the basic feature set ranges from $17,000 to $28,000.

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Blueline Software, Inc. has introduced the Automatic Operator II data center management tool.

Automatic Operator II runs on MVS, VM and VSE systems. It automates repetitive data center operations at prearranged times or in response to system events.

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BGS Systems, Inc. has begun shipping the Bestnet Multi-Session Analyzer for VTAM.

The software product analyzes terminal-to-host application traffic performance in VTAM environments with session managers.

It allows users to correct virtual terminal problems, according to the company, and also provides information on session manager overhead.

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HARDWARE

Data storage

Andataco Computer Peripherals has created a 1.7G-byte, 5¼-in. disk drive subsystem for use with IBM RISC System/6000s.

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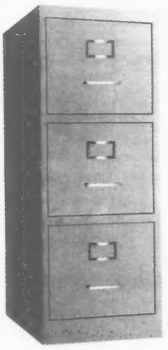
Aptec Computer Systems, Inc. has expanded its line of mass storage devices with the Concept 510 disk subsystem.

The rack-mountable Concept 510 provides up to 5.2G bytes of storage capacity and sustained transfer rates of up to 9M byte/sec. Its architecture was designed to meet the requirements of high-speed, real-time applications. The product works with the firm's I/O Computer line, providing up to 120G bytes of storage in a fully configured system.

Prices for Unix systems are $68,500 to $83,500. Prices for VMS systems range from $51,500 to $61,100.

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22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Suprv. of Programming, Software Dev.
32. Programmers, Software Developers
60. Sys. Integrators/VARs/Consulting Mgt.
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12. Vice President, Asst. VP
13. Treasurer, Controller, Financial Officer
41. Engineering, Scientific, R&D, Tech. Mgt.
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PC & WORKSTATION SHORTS

Prices cut on monitors

Toshiba America CP, Inc., the U.S. monitor-making division of **Toshiba Corp.**, dropped prices on two of its 17-in. Flat Square monitors. Toshiba reduced its P17CS01 monitor pricing by 15%, to $2,100, and its P17CM01 by 10%, to $1,900. Both displays have 1,280 by 1,024 dot/in., support for IBM Video Graphics Array, 8514/A and Apple Computer, Inc. Macintosh II systems.

Radius, Inc. and **NEC Technologies, Inc.** have signed an agreement under which Radius will provide NEC with video interface technology for Macintoshes. The products will be designed and manufactured by Radius and optimized for NEC Multisync FG monitors.

Ensemble Corp. last week announced an add-in application generator for Borland International, Inc.'s Paradox 3.5 relational database management system. Command Center was designed as a menu-driven application generator for nontechnical users. It retails for $449.

Cirrus Logic, Inc. and **Fluent Machines, Inc.** last week announced a development agreement aimed at adding new video capabilities to PC-compatible platforms. Under the agreement, Cirrus Logic's Pixel Semiconductor subsidiary will produce integrated circuits that are compatible with Fluent's Fluency software.

Aerospace giant commits to workstations

ON SITE

BY MARYFRAN JOHNSON
CW STAFF

ST. LOUIS — McDonnell Aircraft Co. has launched a massive transition from proprietary to open systems, adding hundreds of Unix-based workstations this year to a network projected to grow to as large as 1,000 systems.

The aerospace company is moving its most profitable line of work — building airplanes — into uncharted Unix territory as it steers away from the relative safety of computer-aided design and manufacturing (CAD/CAM) applications running in a classic, mainframe-based environment.



"We are basically changing our entire way of doing business," said Dick Navarro, deputy director of information technology at McDonnell Aircraft, a division of McDonnell Douglas Corp. "I'm not aware of any other companies trying to integrate their business strategy with their CAD/CAM strategies."

Dominating the aerospace company's evolving client/server network are Hewlett-Packard Co. Series 700 workstations and Sun Microsystems, Inc. Sparcstation 2s, running a CAD/CAM application called Unigraphics from Electronic Data Systems Corp.

The current network of 300 workstations will grow by at least 300 more workstations by the end of this year and could hit the 1,000 mark the following year, McDonnell information systems executives said.

The workstations are being deployed mainly for a redesign of the U.S. Navy's FA/18 Hornet fighter plane.

"There are people here concerned with the robustness of Unix itself and what one has to do with a network and network management, but these are challenges we've decided are worth the experience," Navarro said.

"We have seen other industries, without the commitment to change, lose out to the world marketplace," the IS executive added. "We're not prepared to let that happen."

Ramping up such a large network of Unix workstations is al-

Continued on page 44

Quicktime applications to debut at Macworld

BY JAMES DALY
CW STAFF

SAN FRANCISCO — Apple Computer, Inc. will not have a lot to introduce, but it will have a lot to talk about this week at the Macworld Conference and Exposition when a host of third-party developers unveil new applications for Apple's Quicktime 1.0 multimedia operating system extension.

Quicktime, which was announced at Apple's developers' conference last June and began shipping late last month, is a System 7.0 extension designed to facilitate the integration of sound, video and animation into Macintosh applications. It will be distributed as an add-on package until the next major revision of System 7.0 later this year.

Hardware and software products that take advantage of Quicktime are considered "Quicktime-savvy" and will be compatible with all other Quicktime-compatible multimedia hardware or software applications, significantly increasing the range of multimedia options available to the end user.

Previously, software applications required special drivers for compatibility with video digitiz-

Continued on page 46

That open religion

Apple officials will use the pulpit of Macworld to talk about their upcoming Open Collaboration Environment (OCE), a system software extension that promises to foster growth in the Macintosh collaborative computing market.

OCE is a set of application programming interfaces (API) that promise to link and integrate disparate applications running under System 7.0. Developers will be able to tap into the power of the extension simply by hooking into OCE APIs. More than a dozen vendors, including Claris Corp., Microsoft Corp., Farallon Computing, Inc. and AT&T, are already considering plans to integrate OCE into their Macintosh applications.

Apple has reportedly shipped early releases of the OCE developer's tool to a group of companies and is readying a final version for imminent release. But don't expect to see OCE products anytime soon.

Third-party developers say they won't be able to ship OCE-based products until Apple releases the extension later this year.

JAMES DALY

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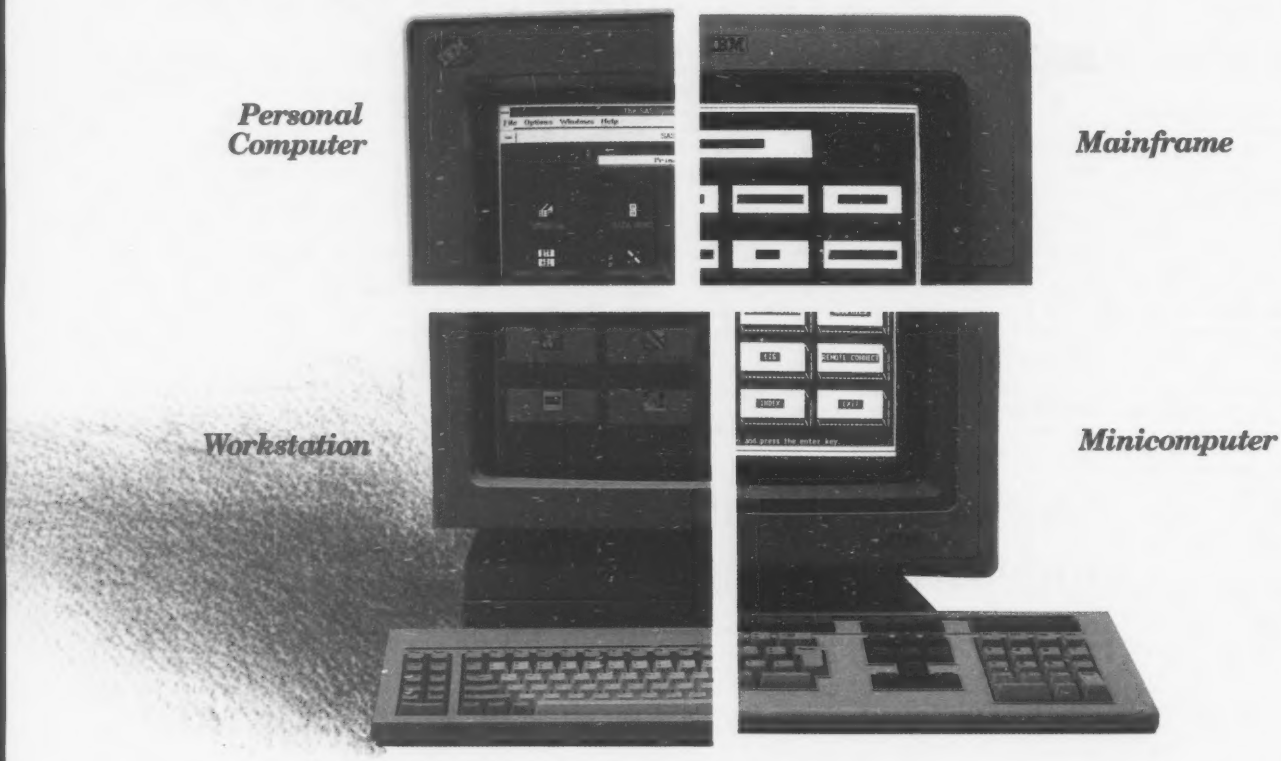
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Docking looks for home port

ANALYSIS

BY MICHAEL FITZGERALD
CW STAFF

In a sense, docking stations let portable users take their car and put a new body on it. But this switch-and-swap concept has not grabbed the buying public by storm because the products have — until recently — been somewhat ahead of their time and may not offer enough advantages to become widespread.

Docking station-style products — known by a variety of names, since NEC Technology, Inc. has trademarked the term "docking station" — range from ones that operate as barely more than battery chargers to products that offer a number of slots for add-in cards, bays for extra floppy or tape drives and even monitor stands. Vendors say users will use the stations to replace desktop systems with portable ones.

Analysts and some users contacted were skeptical of this happening. Docking stations "are not taking the market by storm. People haven't gotten into the mind-set for buying and using them as a main computer," said Jeremiah Caron, senior analyst at Faulkner Information Services, Inc. in Pennsauken, N.J.

"They're not much in demand [by our users]," agreed Dick Nelson, vice president of agency systems at New York Life Insurance Co. Nelson said New York Life's experience has shown most docking stations are inconvenient at best. "If they were simple, easy and convenient to use, there'd be demand for them," he said.

Other users like docking stations.

"I'm a real strong believer in the laptop with the bay station," said Glenn W. Sandusky, chief information officer at Miller Mason & Dickenson, a Chicago-based benefits consulting firm owned by Aon Corp. Sandusky said any new personal computers his company's Philadelphia office buys this year will be Compaq Computer Corp. LTE 386S/20 notebooks with expansion stations in place of desktops.

17% have them

Overall, though, demand today is low. A recent International Data Corp. (IDC) survey showed that on average, 17% of portable users have docking stations.

"The most significant trend is that users have not looked to . . . buy docking stations," said Richard Zwetchkenbaum, senior hardware analyst at IDC. Zwetchkenbaum said he sees no sign that the end user is using the portable as a desktop replacement.

Even where users might have a portable as their main machine, issues remain with docking stations. Users must buy an external monitor, a full-sized keyboard and possibly a networking card. In many cases, the user will have to purchase an external floppy disk drive or an extra drive for the docking station.

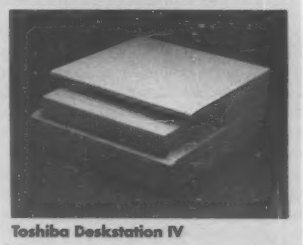
Also, docking stations usually work only with a specific portable model. Typical is Compaq, which makes two different expansion chassis, one for the SLT laptop based on Intel Corp.'s 80386SX chip and one for the LTE 386S/20. No other Compaq portables work with either expansion chassis, and the two are not interchangeable.

Compaq says that in the future it will aim to offer portables that work with the existing expansion chassis. Compaq spokesman John Sweney said the expansion chassis is an important product for Compaq, as 40% of its 386SX-based portables are sold with it.

Toshiba America Information Systems, Inc.'s Deskstation IV, which supports three notebook models, is projected to sell with "between 10% and 20%" of the company's notebooks, up from single-digit figures, said Grant Johnson, director of product marketing at Toshiba.

Unfulfilled promises

Devices that give laptop computers desktop capabilities are limited by their 'cons'



Toshiba Deskstation IV

Pros:	Cons:
• Allow for add-in cards.	• Most likely require a monitor and a keyboard.
• Have bigger hard drives.	• Are less useful as notebooks gain increased power, storage capacity, networkability.
• Can eliminate need for desktop unit.	

CW Chart: Marie Haines

Church performs own Unix conversion

BY KIM S. NASH
CW STAFF

LOUISVILLE, Ky. — Many small and medium-size companies downsizing from proprietary to Unix-based systems hire third-party specialists to convert existing applications to the new machines, but the Presbyterian Church (USA) Foundation opted to do the work itself.



Presbyterian Foundation staff members *are rewriting some applications for their new IBM RISC System/6000 system*

In August, the foundation, which raises and invests money for the Presbyterian church, started a six-month mission to move from a Wang Laboratories, Inc. Model VS100 minicomputer to an IBM RISC System/6000-centered operation.

As it phases in the new hardware, the foundation's three-man systems department is rewriting parts of Cobol applications with Netron/CAP, a set of application development tools from Netron, Inc. in Toronto. Netron/CAP is specifically for RS/6000 programmers.

With the VS100 at its information processing limit, the foundation initially considered an RS/6000 Model 930, which reportedly benchmarked at about 43 Specmarks. The 930 the foundation was eyeing included an extra 128M bytes of memory, six 856M-byte hard drives and other peripherals. When information systems director Doug Yeager discovered that the next model up the line, the 950, topped 72 Specmarks and, configured the same way, would have cost a "bargain" $27,500, he quickly signed a contract to install one as a host machine.

A similar CPU upgrade in a traditional minicomputer environment would cost $100,000, Yeager estimated. "The price/performance ratio just blows you away," he added.

While the hardware change seemed like an easy decision for Yeager, the real issue was preserving time and money invested in custom-crafted applications.

Yeager decided against using a software conversion center because he said he could not find one that "thinks the way we do." The organization generates approximately 5,000 letters, solicitations and other word processing documents per year, which Yeager calls "integral" to the business of controlling the church's $28 million in annual donations.

The foundation's Master Address System, a database of mailing labels for donors and gift recipients, is tightly woven into the Wang word-processing application. The organization is keeping the Wang software as a core application and modifying elements of it for Unix.

"There's no way we could start all over again with brand-new software," he said.

The foundation runs Netron/CAP on an RS/6000 Model 320H. Yeager said that because the operating system used for development and the one that will ultimately host the applications are the same — AIX — the rewrite process will be smooth.

The latest version of Netron/CAP, which hit the market in September, was one of the first development tools for AIX, a Netron spokesman said. The $10,000 kit generates Cobol that can be understood by machines in an open systems environment.

Bank adopts modular attack for EIS rewrite

BY ROSEMARY HAMILTON
CW STAFF

Huntington National Bank is completing a rewrite of an executive information system (EIS) it began developing two years ago.

After more than a year of prototyping and pilots, the bank's information systems staff decided it would be more efficient to use a modular approach to its software design. That meant a major overhaul of existing code, a project that began in mid-1991 and should be wrapped up in March, said Cary Serif, manager of applied technology.

Serif's group used the Easel Corp. application development environment initially running under Microsoft Corp.'s MS-DOS and then IBM's OS/2. He said that without this type of high-level development tool, the initial system would likely still be incomplete.

"You just can't use the old tools to design a client/server-type application like an EIS," Serif said.

In 1990, Serif's staff was sending pilot versions of the EIS to a few executives. At the time, "we wanted to be as responsive as possible," he said. "So, we didn't really say, 'Is this the most expeditious way to do this?'

"To get their attention in the early phases, we needed to prototype quickly. The sacrifice is [that the code you get is] not the most robust code."

This problem emerged as Serif's group moved to sign on more executives. The goal was to make the software as easy to use as possible so it would appeal to the new executives, many of whom had little experience with personal computers, Serif said. They needed to provide the executives with a set of functions, and the goal was to tailor the EIS to each individual's needs. Most executives would make use of such common functions as access to human resources data or stock market information.

However, some executives wanted a slightly different combination of these functions. In prototyping the system for different executives, the IS staff was duplicating its efforts, Serif said.

"By the beginning of the second quarter in 1991, we began to say, 'We've got to rewrite because we will keep running into problems,' " he said.

The staff shifted to a modular software approach. Each key function was identified and created as a separate, reusable module. "We have to be as modular as possible," Serif said. "We want to plug and play as we add new executives and new requirements."

The modules allow the staff to configure a "new" system by assembling existing modules for each new user. Serif said the Easel software allowed the staff to rewrite code fairly quickly.

Stingray installation package targets developers

BY CHRISTOPHER LINDQUIST
CW STAFF

FRANKLIN, Mass. — After some production delays that prevented a scheduled Nov. 1 release, Stingray Corp. has announced that its software installation package, Embark Professional Version 1.0, is now shipping.

The product allows software developers to create and test customized installation programs and master disks for the distribution of their software to end users without the use of programming. This eliminates the need for the developer to write installation programs from scratch or having to use DOS commands such as COPY and MKDIR to install a package.

"The interface is very elegant — the best I've seen," said Joe Stagner, an engineering support specialist at JPI Topspeed Consortium, Inc., a compiler and programming tool developer in Rindge, N.H., who has worked with several installation packages.

Stagner said information systems users could find the Stingray package very helpful for such functions as creating customized installation disks for software that would allow users simply to type "install."

Embark Professional allows developers to create master disks and self-running installation programs intended to simplify end-user installation of software and updates. Among the product's features are the following:

- The product uses a series of menus to design the installation procedure — no programming is required.
- The final installation program can check system configuration to determine whether the system can support the software to be installed.
- Context-sensitive Help screens can be added.

Pricing begins at $299 per product to be installed.

Workstation commitment

CONTINUED FROM PAGE 41

ready posing broad questions about data management, security, disk storage and memory, said Thomas Mooney, manager of computer operations at McDonnell Aircraft. "We're learning we have major data management problems," he noted. "What happens when the workstation fills up? What do you do with all that data?"

Teaming up

For now, the data files reside on 10 HP and Sun servers on the network. "Our architecture isn't pure enough yet to let us know where our release files will end up," Navarro said. The company is closely watching the development of Unix databases and tools for signs of "industrial grade" capabilities found in the mainframe environment, he added.

In a process McDonnell managers call "integrated product definition," teams of employees from engineering, tool design, manufacturing, maintenance and product support all work collectively from the beginning of the design process through to final product. "We're calling on all these people to work differently," Navarro said.

User training is therefore a key concern. "Our biggest problem would be lack of knowledge of Unix," Mooney said. One way the IS staff is easing the transition for users is with a special staging area where the hardware is configured, the software loaded and the system prepped to "plug and play" immediately on the network, which spans more than 200 buildings in a two-mile radius.

One of the simpler problems solved thus far, Mooney said, was when the initial workstations ran out of memory and disk space. "Our model sizes are so large, we were having to do too much disk swapping and it was impacting performance, primarily on the Suns," he said. "So we bought more memory and bigger disks."

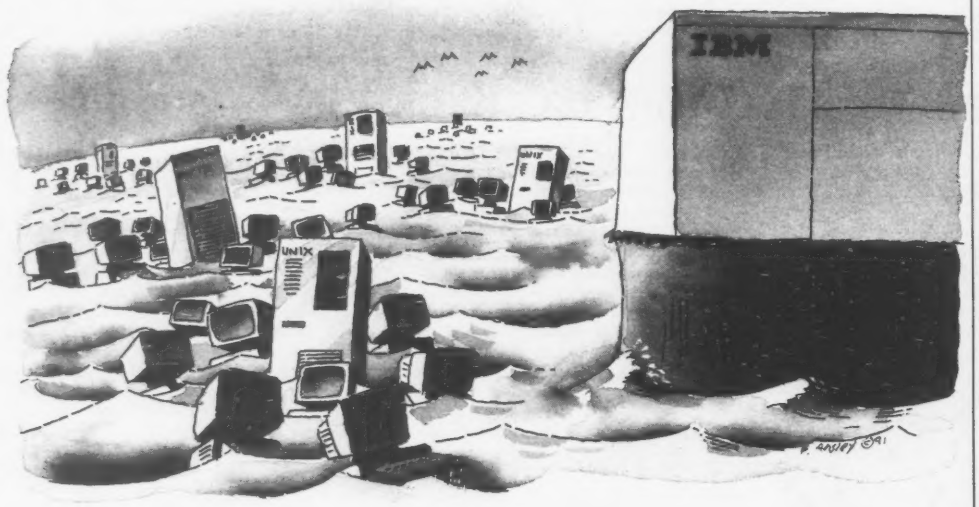
The rising tide of data traffic is also pushing the company to upgrade its current 10M bit/sec. Ethernet network to a Fiber Data Distributed Interface network, Mooney said.

Along with the FA/18 Hornet contract, another deal in the works is a subcontract with McDonnell Douglas for the aircraft division to build the wing for the MD 12 commercial aircraft. Once a contract is signed on that project, EDS will supply the Unigraphics seats on HP/Apollo 9000 Model 700 workstations, Navarro said. The FA/18 project marks the first time Unigraphics has been used by McDonnell as a major aircraft design tool.

A corporate shift toward buying commercial packages rather than building and maintaining in-house software prompted the phaseout of McDonnell's in-house CAD/CAM product in favor of Unigraphics, which runs on Unix platforms from Sun, HP and Digital Equipment Corp. Originally a McDonnell Douglas product, Unigraphics was sold last summer to EDS along with the aerospace company's systems integration unit.

"We're not throwing our mainframes away . . . but the work they do will change to more of a server-type environment" for other business applications, Navarro noted.

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PC Magazine 12/31/91	Uses fewer resources	New flexibility, friendlier	Best text editing	Integrated graphic features	NC	NC	NC	A triumph of flexibility	Spectacular refinements
Infoworld 10/21/91	NC	Power easy to get to	Great drag-and-drop text feature	Well-integrated	NC	On-line reference to Wordperfect	NC	Sets new standards	Startlingly good
Users									
Larry Shaw, Nordstrom, Inc.	Good	Very good	Very good	Very good	Very good	NC	Good	Good	Useful improvements
Seth Ritter, Turquoise Trail Productions	Good	Very good	Very good	Very good	Very good	Very good	Good	Very good	Fun to use
Barbara McShane, Pacific Gas & Electric Co.	Good	Very good	Very good	Very good	Very good	Very good	Good	Very good	Nicely integrated package
Analysts									
John Rymer, Seybold Office Computing Group	Good	Very good	Very good	Very good	Very good	Very good	NC	Very good	More than just a word processor
Deborah Hess, Datapro Information Services	Fair	Very good	Very good	Very good	Very good	Good	Very good	Very good	Very impressive
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Technology Analysis — A roundup of expert opinions about new products. Summary written by free-lance writer Suzanne Weixel.

Improvements and additions abound in Version 2.0 of Microsoft Corp.'s Word for Windows. Reviewers at leading personal computer publications unanimously claim that it is now the friendliest, most flexible and well-rounded word processor available for the Windows environment.

Performance: In Version 2.0, Microsoft managed to improve response times for most functions and to free up some system resources. Still, minimum recommended memory is 2M bytes, and system optimization is required to save memory. Novices may not have the skills required to optimize performance, reviewers said.

Ease of use: A customizable icon bar, well-organized menus and informative dialog boxes combine to create a very user-friendly interface, reviewers said. Other features also make operation easier and more fun than earlier versions. These features include the following: a file finder, simplified mail merge and click-and-drag movement of text and graphics — as well as rows and columns — in tables. There is even optional keyboard mapping for competitor Wordperfect Corp.'s Wordperfect. Macros and styles remain powerful but are still inaccessible to novices, and some inconsistencies in menu structure remain, reviewers said.

Editing capabilities: Word 2.0's editing feature set should satisfy all but the most demanding users. In addition to the standard text entry and processing features, users can customize bullet lists, collapse outlines and mark text for spell checking. They can also open up to nine documents at a time; there are five editing views and an uneditable page preview.

Output capabilities: New graphics features include the following: an equation editor, a charting module, a drawing program and frames for text and graphics. Users can mix portrait and landscape pages in a single document, overlay graphics and text on any graphics file and import most graphics formats into the drawing module. Reviewers applauded the richness of these features and raved about a new automatic envelope printing feature as well.

Windows compatibility: Word 2.0 sets new standards for Windows compatibility by working with multiple documents and applications. All of the modules are Object Linking and Embedding (OLE) servers. In addition to using them in Word 2.0, users can access them from any application that supports OLE and use them as stand-alone applications. One minor gripe is that documents cannot be reduced to icons.

Documentation: In addition to the massive manual and individual module guides, Microsoft added convenience features such as a Jump Start card for those who hate reading user manuals.

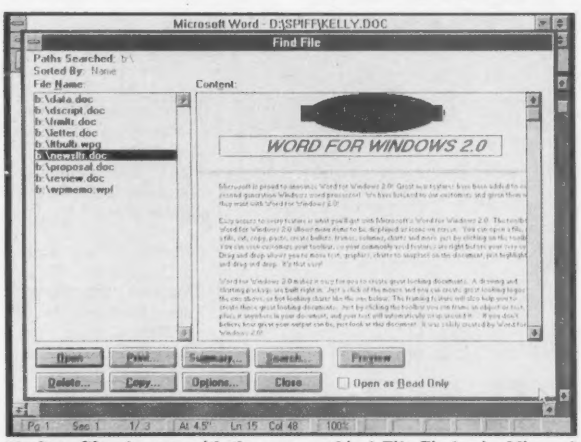
Service and support: Microsoft's standard support policies and technical support are consistently solid, reviewers said.

Value: At the minimum, Word 2.0 is an easy-to-use, full-featured text processing package. With the integrated OLE modules, users can have access to many other applications as well. Word for Windows 2.0 lists for $495.

Vendor financial ratings

Analysts	Long-term stability	Short-term performance	Overall
Peter Rogers, Robertson, Stephens & Co.	Very good	Very good	Very good
W. Christopher Mortenson, Alex. Brown & Sons, Inc.	Very good	Very good	Very good

Microsoft Corp., based in Redmond, Wash., reported 1991 revenue of $580.5 million, a 57% increase over 1990, and a profit of $144 million, a 64% increase over 1990.



Finding files is *easy with the new graphical File Finder in Microsoft Word for Windows 2.0*

Microsoft responds

Chris Peters, general manager of the Word business unit:

Performance: Users running Word on a 386SX with 2M bytes of random-access memory should understand how to optimize their system. An inexperienced user, who may install it with all of the defaults for Windows and DOS, would do better with 4M bytes of RAM.

The whole program is only 1M byte big. Even with 2M bytes, it's not hard to make it work well. If you are running Excel and lots of other things and the system isn't optimized well, you may have trouble.

Ease of use: The macro language is not complex enough for the people who use it. They are a different audience from the general text-processing audience, who can use the macro record feature without understanding the macro language at all. We did improve the style and template features.

Windows compatibility: Minimizing a document into an icon is just not that important to most users. Someday we may get to it, but for now we'd rather work on features such as the envelope generator, which people really use every day.

NEXT WEEK

▶Desktop environments: Reviewers say DR DOS 6.0 competes well with MS-DOS, and Norton Desktop for Windows offers powerful functions.

Quicktime applications to debut

CONTINUED FROM PAGE 41

ing devices. Now, an applications software developer can write a single Quicktime-compatible driver for a program to obtain compatibility with all Quicktime-compatible multimedia hardware products.

More than 100 Quicktime-savvy products are expected to be featured at the four-day show, including the following:

• Wordperfect Corp. in Orem, Utah, will introduce Wordperfect for Macintosh Version 2.1, which adds System 7.0 and Quicktime support. Wordperfect 2.1 will allow users to build documents that include video clips as well as text and graphics. The update will also include refinements to the interface, spell checker and increased speed for the graphics editor, allowing for faster editing of graphics. Wordperfect 2.1 will ship this month and will retail for $495.

• Radius, Inc. will announce that RadiusTV, its $1,699 multimedia hardware and software platform, and Impressit, its $159 still-image compression software, will both support Quicktime. The Quicktime-compatible versions of RadiusTV and Impressit will be available by the end of this quarter, officials at the San Jose, Calif., company said.

• The Company of Science & Art will announce the second generation of its audio/visual playback system, the $199 Paco 2.0, which will give users the ability to play videos, animation and Quicktime movies on all Macintosh personal computers, as well as PCs running Microsoft Corp.'s Windows 3.0 and Sparcstations from Sun Microsystems, Inc. The platform-independent application will sell for $199, officials at the Providence, R.I.-based company said.

• Motorola, Inc., Ex Machina, Inc. and Telepoint Systems Group will announce a new application called Notify that takes advantage of System 7.0's inter-application communications ability and Motorola's wireless hardware technology. It costs $149 for a personal version, which is available now, and $399 for a networked version, due this summer.

• Microsoft Corp. will announce add-in Quicktime support for Excel 3.0 and Word. The additions will allow users to add movie components to both Excel and Word documents, Microsoft officials said. The add-ins will be available later this quarter.

• Mass Microsystems, Inc. in Sunnyvale, Calif., will announce that a Quicktime component will be available in March for its Quickimage 24 video-capture card.

• Light Source, Inc. in Greenbrae, Calif., will roll out Ofoto 1.1R, a retail version of its image scanning software that includes the ability to offer still-image compression of ratios of up to 25:1 through Apple Quicktime technology. Ofoto had been available exclusively with the Apple Onescanner, but the $395 update will make it available for use with a wide range of gray-scale scanners.

• Eastman Kodak Co. will make available its Photo CD Access Developer Toolkit, which allows users to build high-quality Photo CD images into their applications.

NEC Technologies to launch fax-equipped laser printer

BY CAROL HILDEBRAND
CW STAFF

A surprising first is expected this week in the Postscript printer arena from NEC Technologies, Inc. The company is slated to announce the NEC Silentwriter Model 95 Postscript laser printer at Macworld this week.

The 6 page/min printer supports Adobe Systems, Inc.'s Postscript Level 2 page description language as well as emulation for Hewlett-Packard Co.'s Laserjet PCL 5 language.

The new twist came in the form of the Model 95's Postscript fax option. Available in the third quarter of 1992, a $599 board will allow users to send and receive plain-paper faxes in either Postscript or Group 3 format.

Sharon Kern, an analyst at International Data Corp., a research firm in Framingham, Mass., said that while she was impressed with the product's price point and functionality, she viewed the fax option more as a marketing tool than a big selling point.

"What they're trying to do is establish a stronger niche for themselves," she said. "The fax accessory is something a little ahead of its time. It'll be interesting to see if they sell it."

The 300 by 300 dot/in. product is priced at $1,749, a significant drop from the previous model, which was in the $2,500 range.

NEW PRODUCTS

Software utilities

Baler Software Corp. has announced Bbase, a spreadsheet application that accesses database files.

Bbase is a companion to the company's Balerxe product. Users can browse and edit database files from within their spreadsheet as well as import and export data between applications.

Bbase costs $199.

Baler Software
1400 Hicks Road
Rolling Meadows, Ill.
60008
(708) 506-9700

Insignia Solutions, Inc. has announced Softpc 2.1 for Sun Microsystems, Inc. Sparcstations.

The product allows users to run DOS applications on the Sun workstation. The new version adds IBM Video Graphics Array color graphics support.

Pricing is set at $695 for a single-user license.

Insignia Solutions
6 Campanelli Drive
Andover, Mass. 01810
(508) 682-7600

Media Management Systems, Inc. has recently announced SuperGUI, a graphical menu system for DOS-based personal computers.

SuperGUI allows DOS users to handle files and select applications through a graphical user interface. It includes an icon editor, automatic phone dialer and a report generator that tracks the amount of time users spend in each application on the PC. The product uses 3K bytes of resident random-access memory when running applications, the company said.

SuperGUI costs $129.95.

Media Management Systems
Suite 600
1 Meca Way
Norcross, Ga. 30093
(404) 564-5606

Storage Dimensions, Inc., a subsidiary of Maxtor Corp., has introduced Speedstor for Sunos.

The software product allows users to install small computer systems interface disk drives in Sun Microsystems, Inc. Sparcstations through a point-and-click menu. According to the company, Speedstor can reduce installation time to as little as 10 minutes. The software costs $149.95 per node or $499.95 per network.

Storage Dimensions
1656 McCarthy Blvd.
Milpitas, Calif. 95035
(408) 954-0710

Software applications packages

Minitab, Inc. has released a new version of its Minitab Statistical Software for DOS-based personal computers.

Release 8 emphasizes ease of use with pull-down menus, dialog boxes and a scrollable session window. The command structure from previous releases can still be used.

The software costs $695 for stand-alone, $1,700 for a one-year network license and $2,500 for a one-year PC site license.

Minitab
3081 Enterprise Drive
State College, Pa. 16801
(814) 238-3280

Winstat, a statistics software package for the Microsoft Corp. Windows environment, has been announced by Kalmia Co.

Winstat offers a full range of statistical analysis functions, according to the company. The price is $395.

Kalmia
Dept. 4, 71 Dudley St.
Cambridge, Mass. 02140
(617) 864-5567

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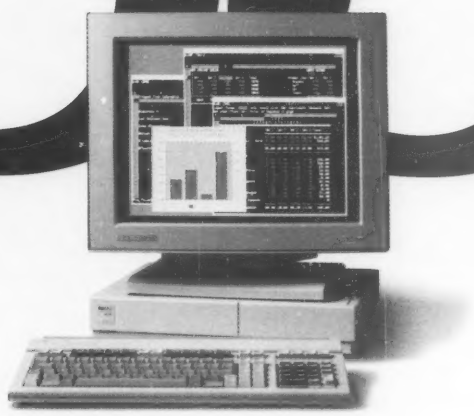
(It left Sun, DEC and IBM speechless.)



Once again, the numbers do

*U.S. list price for 19-inch grayscale display, diskless, 8MB system. ©1992 Hewlett-Packard Company ADCSWG017

35 MIPS

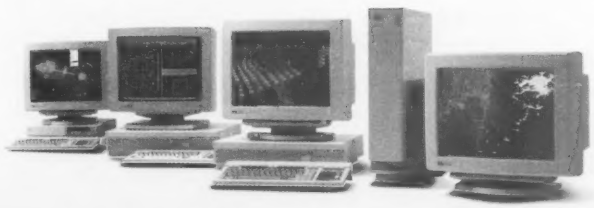


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COMMENTARY

Elisabeth Horwitt

APPN going way of SNA



Everyone, including vendors, agrees it's a good idea for local-area network routers and servers to support IBM's peer-to-peer SNA protocols. What no one seems to agree on, though, is how to do this. A subset of that question is: Do users really want their routers to get so involved with SNA as to act like full-scale IBM front-end processors?

Third-party vendors committed to linking up to IBM hosts must long for the good old days, when all it took was a 3270 emulation board.

IBM has raised the ante for SNA support steadily during the past few years. First, it introduced LU6.2, or Advanced Program-to-Program Communications, which most major host vendors and many router vendors now support.

IBM further upped the ante with PU2.1, which defines how physical devices can talk to each other as peers over an SNA network without always going through an IBM host. While HP and DG support the protocol, DEC has been a holdout. DEC's objection to PU2.1, some sources say, is that IBM is pushing the protocol not only for its own systems, but as a peer-to-peer industry standard.

Now IBM is doing the same thing with Advanced Peer-to-Peer Networking (APPN), a PU2.1-based platform that coordinates communications and resource sharing across a multinode SNA network. IBM has made it clear that APPN is the SNA of the future and has released the specifications that allow a non-IBM system to act like an APPN end node — that is, a client that can access APPN resources.

IBM has still not announced that it will publish APPN network node specifications, which allow non-IBM systems to participate as full members of an APPN network, acting as directory and routing servers. However, most industry sources agree that IBM cannot afford to keep APPN Network Node to itself if it wants to succeed in its plans to make APPN an enterprisewide LAN protocol.

Continued on page 54

Migration to public nets accelerates

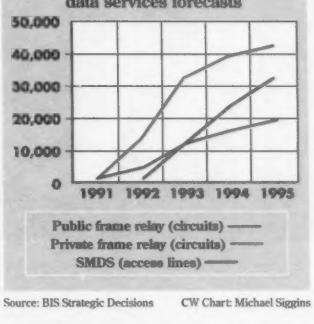
ANALYSIS

BY ELLIS BOOKER
CW STAFF

Attractive economics and the appearance of new, high-bandwidth services on public networks mean companies that once had to build private facilities to get the networking they needed are increasingly looking at what the public carriers have to offer.

Public life

Growth of public frame relay and SMDS is expected to soar past private frame relay in the high-speed market



Source: BIS Strategic Decisions CW Chart: Michael Siggins

Analytical firms concur that an important catalyst for this move to public facilities is the move to link companies with their suppliers and customers for bandwidth-hungry applications, such as imaging. In this environment, private point-to-point networks, which are not inherently suited for connections to points outside the private network, are found wanting.

Unfortunately, users complain that the local-access carriers are lagging behind their interexchange counterparts in this regard. One data communications manager at a Midwest industrial parts company said: "Sure, if it was cheaper, secure and robust we'd use the public network for most of our data applications. But until [the local telephone company] provides access to all our locations, what's our option?"

A number of local exchanage companies, sensitive to this criticism, are trying out high-bandwidth, multimegabit services for metropolitan-area networks. Meanwhile, telephone companies are feeling the heat of state regulatory authorities, who are considering freeing up the local exchange to more competition.

No one is predicting the end of private, point-to-point networks, however. "We're not talking about them being eliminated," said Davis Kerr, associate director of the communications consulting group at BIS Strategic Decisions in Norwell, Mass. "We're talking about users handling traffic growth over the public networks, for new facilities or high-bandwidth-type services."

In a recent report, Kerr predicted an accelerated migration to public facilities for high-bandwidth services that use efficient packet technologies such as frame relay and high-speed switched technologies such as Switched Multimegabit Data Service (SMDS), a 1.5M to 45M bit/sec. service.

The report projects the market for public frame relay will reach some 42,000 permanent virtual circuits (PVC) by the end of 1995 — about twice the number of frame-relay PVCs that will be on private networks.

Similarly, the study concludes that the size of the SMDS market will depend on the rate that the local telephone companies make this technology commercially available.

Significantly, even a 5% to 10% price differential between private and public facilities would be enough to cause many companies to jump ship to public facilities, according to a majority of the 800 senior communications and information systems managers BIS Strategic Decisions surveyed in its study.

One application driving this interest in high-bandwidth public services is electronic document imaging, according to a study recently produced by Technology Futures, Inc., a market research company in Austin, Texas.

In its report, Technology Futures concludes there is a need to upgrade the public network infrastructure to meet an expected explosion in electronic imaging by the year 2000, when it believes some 60% to 80% of professionals will have access to document-based and photorealistic image applications.

Food stamp program soon to be electronic

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — The U.S. Department of Agriculture has published draft rules for the electronic distribution of food stamps, giving states the green light to turn a handful of pilot projects into a national network of production systems.

Automation of the $17 billion food stamp program is expected to reduce fraud, speed the transfer of funds and eventually eliminate the annual cost of processing some 2.5 billion paper coupons.

The Food and Nutrition Service's (FNS) guidelines, recently published in the Federal Register for public comment, cap eight years of small-scale demonstration projects in Maryland, Pennsylvania, New Mexico, Minnesota and Iowa. Maryland is expected to go statewide with a production system by the end

Continued on page 55

Paper chase

The Food Stamp Program delivers 2.5 billion food stamps, worth $17.3 billion, to 8.5 million households annually.

The stamps are handled by 223,000 food stores, which make 2 million deposits monthly at 10,000 banks.

The banks make 40,000 food stamp deposits monthly at Federal Reserve district banks.

According to The Food and Nutrition Service's Joseph Leo, the 2.5 billion paper coupons are counted at least a dozen times.

CW Chart: Janell Genovese

Companies enhance inverse multiplexers

BY JOANIE M. WEXLER
CW STAFF

The neophyte inverse multiplexer has been getting more sophisticated and will continue on that track at the Communication Networks (Comnet) '92 show in Washington, D.C., at the end of the month.

Inverse multiplexers allow users to transfer data at up-to-T1 speeds without a dedicated circuit and without subscribing to high-speed switched public services. The devices build virtual switched circuits only when needed. This can be cost-effective for users who do not want to pay for dedicated lines to accommodate occasional peak traffic loads. The multiplexers accept data from applications, then break it out to multiple transmission services.

Leading the vendor pack at Comnet '92 is Teleos Communications, Inc. in Eatontown, N.J., which said it will announce its Network Access Hub product line. The hubs aim to allow users to switch multiple applications (such as local-area network interconnection) on a call-by-call basis to AT&T, MCI Communications Corp. and U.S. Sprint Communications Co. services simultaneously.

Most inverse multiplexers support just one application. Also, while most interface to all three carriers' services, they do not do so on a call-by-call basis. Most require an application to be predefined for a given service.

Teleos' device will also access both switched and dedicated communications lines, said Jarek Chilinski, Teleos' product line manager for network access products. Most products today interface only to switched services, though Promptus Communications, Inc. in Portsmouth, R.I., announced the dual interface capability last month.

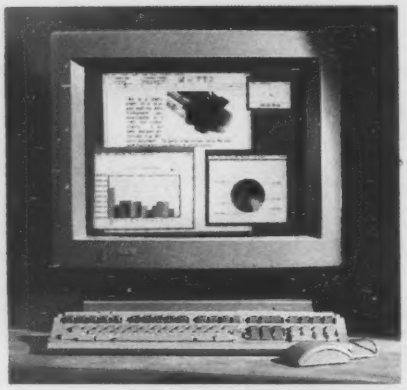
The following were also announced during recent weeks:

- Ascend Communications, Inc. in Alameda, Calif., rolled out Version 3.0 of its widely installed Multiband controller. The new version automatically tests each communications line for errors before transmitting. It also offers a $500 palmtop option for portable, remote device management.
- Digital Access Corp. in Reston, Va., has packaged a video bridge into its Fracdial product that eliminates the need for a pricey (up-to-$150,000) separate controller for dialing up multipoint videoconferences.

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WAN fine-tuning puts broadband use on hold

BY JOANIE M. WEXLER
CW STAFF

Despite the imminent surge predicted in wide-area network traffic, analysts agree that broadband WANs are not likely to ignite before the mid-1990s.

Broadband networks carry communications traffic at speeds above 1.5M bit/sec. However, new-generation packet-switching and data compression technologies are allowing tightfisted companies to squeeze more out of their existing 1.5M bit/sec.-and-under bandwidth, said Rick Malone, a principal at Vertical Systems Group, a Dedham, Mass.-based consultancy.

For example, frame relay, an efficient form of packet-switching rolling out internationally at up to 1.5M bit/sec. speeds, is said to boost T1 performance by up to 35%.

In addition, two key broadband drivers are lagging. It takes time to develop widespread, bandwidth-hungry multimedia applications, and it will be a while before still-neophyte, high-speed Fiber Distributed Data Interface local-area networks link over wide geographic areas.

The resulting evolutionary movement to broadband networking presents a sales challenge to switch makers already targeting the sparse end-user market and needing to aggregate such voluminous quantities of data. These vendors include Adaptive Corp., a Redwood City, Calif., subsidiary of Network Equipment Technologies, Inc.; and T3plus Networking, Inc., a Santa Clara, Calif., start-up.

T3plus said it plans to announce today a modular T3 switch that allows users to manage the bandwidth of their T3 networks. The $42,000-and-up product, based on a circuit-switching core, will ship in the second quarter of this year and will add broadband fast-packet networking in 1993, T3plus President Richard E. Pospisil said.

Pospisil acknowledged that broadband is in its early stages, though the firm originally thought the market would hit its inflection point in the latter half of 1991. "The customer is watching his dollar as we've never seen before," he said.

Even so, 2-year-old T3plus said it has supplied its previous-generation broadband switch to more than 20 Fortune 500 companies. Northrup Information Resource Center had a T3plus switch delivered last week for use in extending IBM host channels at channel speeds, network technologist John Beecher said.

Beecher acknowledged that "the technology is not cheap, so there are probably not a lot of people in general industry with these bandwidth requirements yet. Or maybe they just don't realize they have them."

Phil Evans, director of telecommunications at $4 billion, Dallas-based conglomerate FMC Corp. and senior adviser to the International Communications Association, agreed that there may be broadband needs that users have not yet identified in their companies. He cited closing automaking plants, saying, "when you lose people and manufacturing facilities, something has to replace that. That's automation and telecommunications teaming up."

Evans added that the rise of more efficient transmission technologies spurs the development of bandwidth-hungry applications, as happened amid a skeptical T1 market seven years ago.

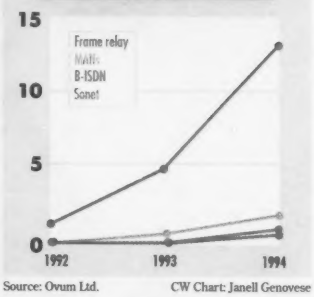
Ovum Ltd., a London-based consultancy that recently conducted a study on broadband trends, still touts broadband Integrated Services Digital Networks (B-ISDN) as the long-term nirvana for the mix of traffic and applications users will want to exchange over wide areas. Until B-ISDN heats up late in the decade, though, the leading broadband technology will be frame relay, said Iain Stevenson, senior consultant at Ovum, because it is the furthest along as an international standard (see chart). "The other backbone connections represent a fragmented approach in Europe, which is a limiting factor," Stevenson said.

"For companies putting together a LAN interconnection strategy, T1 and packet switching just aren't up to the job. The first stage of solving this will be integrated frame-relay service, followed by linked metropolitan-area networks," he added.

Among the other technologies emerging to handle broadband include cell relay and Switched Multimegabit Data Service (SMDS). Frame relay, cell relay and SMDS in the U.S. are initially rolling out at up-to-T1 (baseband) speeds. A fiber-based Synchronous Optical Network infrastructure will eventually carry these services.

Broadband boom

Frame relay will maintain its dominance even at speeds above 1.5M bit/sec.



Source: Ovum Ltd. CW Chart: Janell Genovese

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CONTINUED FROM PAGE 51

Most of the major router companies have indicated that they will incorporate APPN Network Node into their products as soon as IBM publishes the specifications. IBM has promised APPN support for the RISC System/6000-based router that should make its official debut shortly.

It will be interesting to watch which LAN server and host companies jump on the APPN bandwagon. Both Novell and Apple announced last spring that they would support APPN End Node. Industry sources agree that Novell will be among the first to provide an APPN Network Node. Sources disagree as to whether Apple is planning to follow suit.

FEW IBM SHOPS are likely to entrust all of their SNA traffic needs to a reverse-engineered front-end processor from a router vendor, however feisty.

IBM's rivals in the host and LAN server arena will probably stay away from APPN because the less multivendor support the protocol gets, the less likely it is to win support outside of deep-dyed Blue shops. And it is not necessary to support APPN in order to access resources on an APPN network — all you need is LU6.2. The drawback of not being an APPN End Node is that you don't get automatically registered as a resource on the network.

In the past few months, some vendors have raised the question of whether users want their routers to support IBM's PU4 protocol, which defines a full IBM front-end processor. Cisco Systems has announced plans to support PU4, while IBM has indicated that it does not intend to implement PU4 in its own router.

An IBM spokesman raises a point: Why go to all the trouble of maintaining Network Control Program (NCP) tables and other PU4 tasks on a router? His argument makes a lot of sense, given how difficult it is to use front ends and NCP as LAN interconnectivity coordinators. APPN has the dynamic routing and directory update capabilities that large LAN installations need for any-to-any connectivity.

So why would someone like Cisco support PU4, while IBM does not? A likely reason is that a router that has both PU4 and APPN can effectively put IBM front ends out of business, handling SNA traffic between LANs and from LANs to IBM hosts. Users can realize huge potential cost savings by doing away with their front ends.

However, few IBM shops are likely to entrust all of their SNA traffic needs to a reverse-engineered front-end processor from a router vendor, however feisty. Cisco, famous for cramming a broad array of protocols onto a single router, may be swallowing one protocol too many.

A more popular scenario right now among users is to settle for routers that handle popular LAN protocols such as TCP/IP and Novell's IPX, plus LU6.2 for efficient SNA connections. A major plus to such products is that they are already here, and they work.

Horwitt is a *Computerworld* senior editor, networking.

Food stamp program to be electronic

CONTINUED FROM PAGE 51

of the year, and 16 other states have said they plan to roll out their own programs.

In the Maryland pilot, 4,000 Baltimore households were issued plastic magnetic-stripe cards and were asked to choose personal identification numbers. In the grocery line, the card is run through a point-of-sale (POS) terminal, the personal ID is entered, and money is transferred from the customer's food stamp account to the grocer's account in a host computer at a regional site. Clearing and account settlement occurs nightly through the Federal Reserve System.

To get on the electronic benefits transfer (EBT) bandwagon, food retailers need simple card-reading devices at the checkout counter, a numerical pad for entering the customer's ID number and the amount of the purchase and a small printer for printing a receipt.

Small stores typically have an ordinary modem for dial-up access, while larger stores have dedicated lines and multiple POS devices on a simple local-area network.

The pilot projects proved technological feasibility and demonstrated the popularity of EBT for recipients, food retailers and financial institutions, according to Joseph J. Leo, deputy administrator for management at the FNS. However, there has been one big drawback: Although EBT saved money for food retailers and banks, the government's cost per person served rose sharply.

To help reduce cost, the FNS suggested that food stamp distribution be piggybacked onto other EBT programs, such as the electronic distribution of welfare or Medicaid payments.

In the Baltimore project, food stamp benefits, aid to families with dependent children and child support payments flow through the same system. Leo said the Social Security Administration and the U.S. Department of Veterans Affairs have also expressed interest in teaming with the FNS.

Transfers preferred

The agency also suggested that future EBT systems use existing regional fund transfer networks rather than establish new networks, as was done in some of the pilot projects. In its draft rules, the FNS did not require use of existing bank networks for communications and settlements, but that may be required in the future.

The food industry is one of the last of the high-volume industries to automate, but it is beginning to install POS terminals connected to networks for authorization and use of debit and credit cards, Leo said. This movement will reach a critical mass in the mid-1990s when most stores have the equipment and network connections to handle a food stamp debit card.

That will produce a wealth of business opportunities for network providers, systems integrators and the systems units of financial institutions, Leo said. Food stamps could add 1 billion transactions per year to commercial networks, while additional forms of government EBT could boost traffic and processing volume by another 1.5 billion transactions, he said.

Leo predicted that vendors will develop standard "core" software that can be used by any state program, with customized enhancements or modifications made in each case.

In the Agriculture Department's draft rules, the FNS said food stamp EBT systems should do the following:

- Provide 10-second or better response time 98% of the time for leased-line systems and 15-second response 95% of the time for dial-up POS terminals.
- Provide 99.9% uptime for central database computers, except for scheduled maintenance, and 98% uptime for the entire system.
- Produce no more than two erroneous EBT transactions out of every 10,000.
- Use the government's Data Encryption Standard algorithm for communications network security.
- Validate messages using range checks, format checks, existence of control characters and other standard edit checks.
- Not cost the federal government any more to operate than existing paper systems, where operating costs include a five-year amortization of start-up costs. States may pick up any added costs, however. The FNS also said it will establish standards for "system ease of use" for food-stamp recipients, food retailers and state government personnel.

Package zaps Mac network nightmares

BY JIM NASH
CW STAFF

WALNUT CREEK, Calif. — A pair of software products from The AG Group, Inc. are aimed at reducing the administrative nightmares users and managers of large Apple Computer, Inc. Macintosh networks often face.

The AG Group, based here, last week announced its Skyline/E monitor. The Skyline/E builds charts that track network performance over a user-determined period of time, enabling managers to watch network traffic over periods ranging from one second to several weeks.

Disk space is the limiting factor. Traffic from any given time period can be broken down by the workstations sending and receiving packets and the packet's protocol.

The AG Group also announced Silver Cloud, its own version of Apple's Chooser function. While Chooser alphabetically organizes devices and services on a Macintosh network by zones, Silver Cloud enables users to group them in their own way.

Locating made easier

According to the company, users of Silver Cloud can move, for example, all printer icons into a separate grouping, giving each device a new name that is more familiar to the user. In this way, locating machines and services in a large network can be made easier.

In addition, the software allows managers to hide devices from users' view, regulating who can use them.

Configured in 50-user packages, Silver Cloud costs $695, 200-user packages cost $1,695, and 500-user versions cost $3,495. Skyline/E will reportedly list for $695.

Both products are expected to ship March 2.

NEW PRODUCTS

Network management

Protools, Inc. has released the Network Control Series, a suite of distributed network management software tools.

Products in the series include a full implementation of Simple Network Management Protocol's Remote Network Monitoring Management Information Base.

Two elements of the series are currently shipping. The Cornerstone Agent offers real-time subnet monitoring and analysis, and the Foundation Manager provides distributed analysis and management for enterprisewide networks, according to the vendor.

Cornerstone Agent costs $1,295, and Foundation Manager costs $8,995.

Protools
14976 N.W. Greenbrier Pkwy.
Beaverton, Ore. 97006
(503) 645-5400

Softshell Systems, Inc. has announced LAN Tamer, a software package providing central control of user activities from any network node.

LAN Tamer works with Novell, Inc. Netware and other major network operating systems. It allows the network manager to automatically install applications on user menus and to control security options. It also provides users with single-key task switching.

The price is $995 for a 10-node local-area network.

Softshell Systems
1163 Triton Drive
Foster City, Calif. 94404
(415) 571-9000

LAN Directory, an automatic hardware and software inventory program, has been released by Frye Computer Systems, Inc.

LAN Directory runs on Novell, Inc. Netware networks and includes a detailed, customizable report writer, the company said. It collects and stores information on all systems connected to the local-area network, performing audits at user-specified intervals.

The software costs $495.

Frye Computer Systems
19 Temple Place
Boston, Mass. 02111
(617) 247-2300

Micro-to-host

Digital Communications Associates, Inc. has upgraded the Irma workstation for Windows communications software for personal computers.

The software runs under Microsoft Corp.'s Windows and includes a 3270 emulator configuration procedure that automatically identifies the type of communications adapter in the PC.

Irma Workstation for Windows 1.1 costs $495. Upgrades are offered for $95. Users of other 3270 emulator software can purchase the product for $125.

Digital Communications Associates
1000 Alderman Drive
Alpharetta, Ga. 30201
(404) 442-4000

Local-area networking software

Datalogix International, Inc. has announced the Global Enterprise Manufacturing Management System.

The client/server Process Requirements Planning management software system includes a relational database management system and a fourth-generation development language. It supports multiple databases and multiple graphical user interfaces across various hardware platforms.

Pricing starts at approximately $250,000, depending on hardware and software configurations.

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MANAGER'S JOURNAL

EXECUTIVE TRACK



Michael Smokovich has been appointed deputy commissioner of the Financial Management Service, a bureau of the U.S. Department of the Treasury in Washington, D.C.

Smokovich will oversee the day-to-day activities of the service, which issues the federal government's payments, manages its collection operations and operates the government's central accounting and financial reporting functions.

A leader in the service's efforts to move the government to the forefront in electronic collections and payments, Smokovich has worked on initiatives such as electronic benefit transfer, the credit-card network and the Internal Revenue Service tax refund offset program.

Before his appointment, Smokovich was the Financial Management Service's assistant commissioner for federal finance.

.....

William L. Thompson has been named assistant director of the **IRS Atlanta Service Center.** He was most recently executive assistant to the assistant regional IRS commissioner for information systems in Chicago.

Thompson held that position since 1989. He joined the IRS in 1972 and has held various management positions in Kansas City, Mo., and Chicago. He recently completed the IRS executive selection and development program, which offers specialized training to executives.

The Atlanta Service Center processes some 20 million federal tax returns from Florida, Georgia and South Carolina.

Who's on the go?

When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Suite 400, 500 Airport Blvd., Burlingame, Calif. 94010.

Net expertise landscape sparse

IS managers use outside assistance, creativity to offset limited in-house resources



John S. Dykes

BY JOANIE M. WEXLER
CW STAFF

As the corporate data center disperses into an ever-growing network of networks, information systems managers need more communications-savvy personnel.

However, many are finding that the available pool of networking talent lags behind the technology invading large companies.

"There is absolutely a gap in available expertise," says Howard Maynard, senior vice president and director of MIS at $1 billion global advertising agency Young & Rubicam, Inc. in New York.

Maynard recently spent nine months searching for a fiber- and frame-relay-knowledgeable director of telecommunications.

The scarce talent is also costly in light of most firms' tightened purse strings. "I can't find expertise in the marketplace to do networking. And even if I could, I couldn't afford a large, highly paid networking staff," says Ed Somol, vice president of MIS at Mast Industries, Inc., the Andover, Mass., data processing arm of $5 billion global retailer The Limited, Inc.

Creative solutions

So what is the IS community to do? Far from throwing up their hands, IS managers are finding ways to cope with this critical expertise shortage with aggressiveness, creativity and plain hard work. Among many methods they use are the following:

• **Turning to outside suppliers.** Mast Industries is pressing its telecommunications carrier for more comprehensive services. It is a participant in AT&T's Asia-Pacific Advisory Council, a group of about 20 global companies, including Mastercard International and Digital Equipment Corp., that AT&T assembled for advice on customer network service requirements.

According to Somol, all the participating companies have asked for the same thing: door-to-door service delivery. International networks require a range of expertise because of technology and regulatory inconsistencies in different countries. Somol says he wants his carrier to manage the relationships with worldwide local telephone authorities and to "deal with the 12-hour time differences" to keep his on-staff head count low.

• **Data center training.** Several IS managers emphasize the need for data center training by outside consultants or an in-house "guru."

Continued on page 64

Recapturing the out-of-control project

BY JAMES DALY
CW STAFF

Regaining control of a runaway project can save not only millions of dollars, it can save careers — including your own. That is the lesson taught by management consultants, who say that a re-examination of goals, a detailed project plan and close monitoring of tasks can pull even the most hopeless situation out of the muck.

"Too often, the first thing people do is panic and begin finger pointing, and that's when things really start spinning out of control," said William Marks, president of POC-IT Management Services, Inc. in Santa Monica, Calif.

Marks said the first pulse check for determining if a project is heading out of control comes after about 20% of the original plan is completed. Telltale signs that a project is doomed include frequently changing requirements, the inability to manage those changes, slipped deadlines, low morale and a wavering of commitment from the clients who commissioned the project.

Those awful symptoms gripped Carol Joel, manager of systems development and



support at Los Angeles-based Certified Grocers of California Ltd., during the creation of a key companywide inventory database. "We got about halfway through the time allotted for the project and suddenly realized we weren't anywhere near where we were supposed to be," she said. "We had never put a box around the project, and it just seemed to keep expanding."

As panic set in, employee confidence became so low that turnover soared to nearly 100%, Joel said. Disaster was averted only after the project team halted all coding and got back to basics. Joel said the project group developed a detailed step-by-step design plan that allotted a specific amount of time for each task.

"That way, we knew exactly where we stood at all times," she said. The result was positive: The project was finished close to the original deadline.

Marks said the key to success is to walk a narrow line between flexibility and structure. Project plans should be detailed enough to involve clearly defined assignments but not so myopic that they do not allow for changing goals. Never go longer than a week without knowing if you are on schedule and keep lines of communication open.

"Just having a plan isn't the answer," Marks said.

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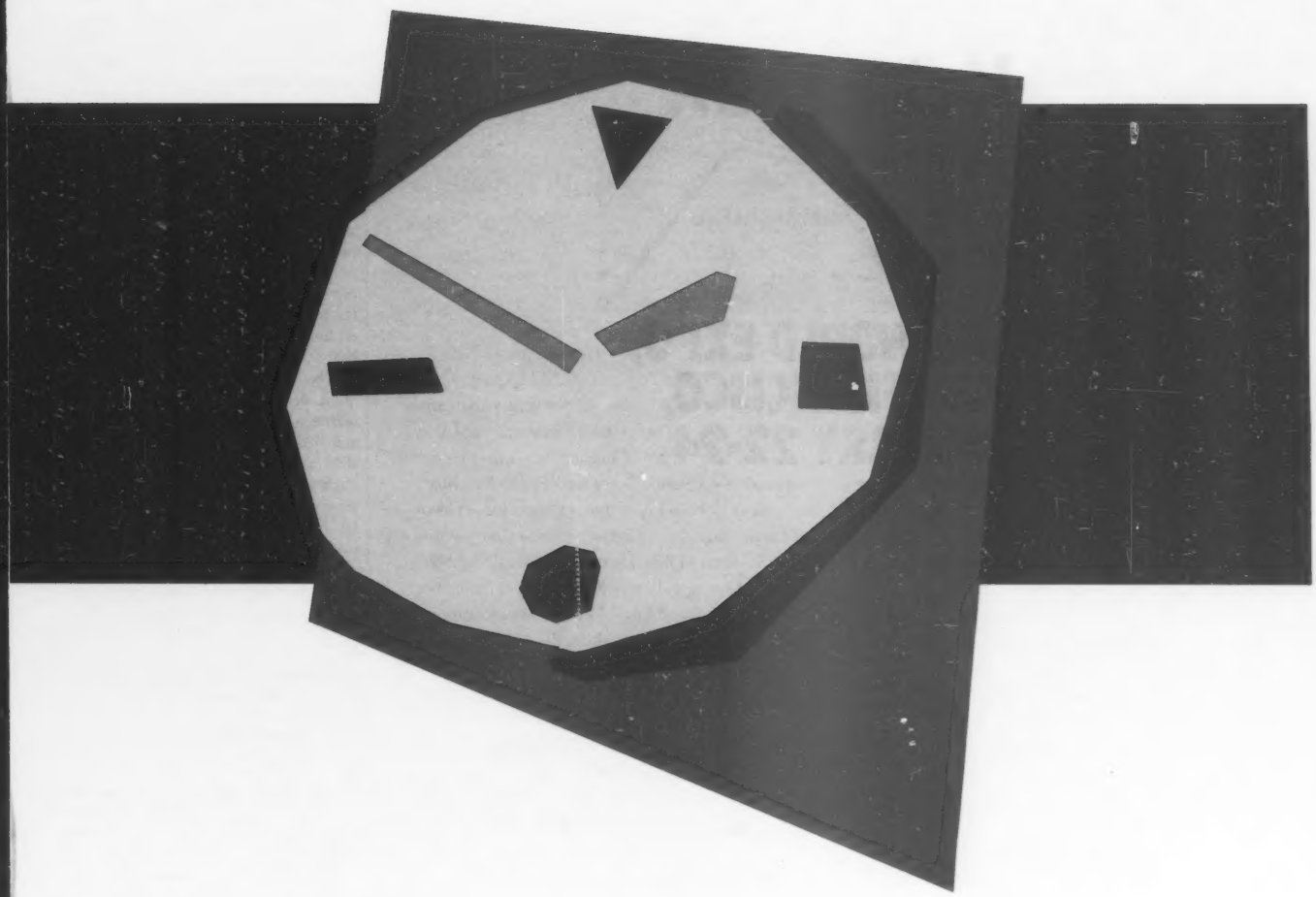
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BOOK REVIEWS

Full caution ahead: Consider jobs carefully before changing career

The Computer Professional's Survival Guide
By Alan R. Simon
McGraw-Hill, Inc., $24.95

"The times, they are a changin' . . . " Gone are the days when computer professionals could job hop to better and better positions with higher and higher pay. Now, the author of this book says, any job move must be considered carefully.

Using commonsense advice, Simon points out that people can still advance their careers in the cold 1990s. In each chapter he provides examples of information systems professionals who have successfully survived their chosen careers in IS and how they have done so. The reader is also provided with information on why people leave their jobs — from downsizing, outsourcing and layoffs — to hot technical areas for the 1990s, alternative career options such as consulting and temporary work as well as tips on how to stay current. Also included in this 171-page, information-packed book are detailed listings of career outlooks for computer professions including chief information officer, database administrators, operations managers, college professors and technical writers.



ALAN J. RYAN

Manager's Guide to Multivendor Networks
By John Enck
Professional Press Books, $35

The well-articulated, 17-page introduction of this book probably justifies its purchase. These pages will hit the hot buttons of executives and information services managers who find themselves in a multivendor networking pickle.

The introduction vividly arranges the scenery and players on today's corporate networking stage. Without reading like alphabet soup, it rounds up the key functions, services and equipment that managers must grasp conceptually to spearhead successful networking projects.

The consistency of the corporate voice, however, falters from there. The author has explicitly targeted two reader audiences: executive management and systems management/personnel. This dichotomy means that managerial concepts and deep technical detail are interwoven, leaving the reader to filter relevant information continually.

Even more distressing is that the author has fallen victim to the very condition of his would-be readers. Because of the rapid fluctuation of technology, the book, published in October 1991, does not include many new developments, especially in wide-area networking and enterprise network management.

The pages devoted to WANs describe old T1 and X.25 technology and reiterate the terminology of still-nascent Integrated Services Digital Networks. We don't hear a peep about frame or cell relay.

The author also doesn't cut to the quick of today's network management worries: integrating local-area network and WAN management, particularly with IBM environments. But Enck does a thorough job of covering the histories and strategies of systems vendors IBM, Digital Equipment Corp., Hewlett-Packard Co. and Sun Microsystems, Inc. A revised edition would do well to swap obscure IBM terminology and standards-body detail for more hands-on information.

JOANIE M. WEXLER

Productivity Sand Traps & Tar Pits: How to Detect and Avoid Them
By Mike Walsh
Dorset House Publishing, $27.75

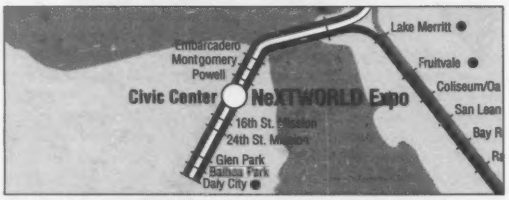
For IS managers who may have forgotten the values of communication and cooperation, Walsh's book provides a much-needed reminder that IS is helpful in resolving business problems but is not a cure-all.

The only way to achieve true management IS is by getting beyond the maintenance of functional systems still in use at so many companies, Walsh says. That goal is only possible when there is high-level management support, which includes funding of comprehensive systems that can be built in stages.

Walsh attempts to pull the reader through the book by countless real-life examples of failed and successful systems and of strong and weak management styles. The topics are approached logically from the standpoint of problems, human resources, cases of productivity success and failure as well as productivity enhancers. However, at 189 pages, the book can become difficult to plow through as Walsh provides more descriptive information than is necessary. A condensed version would be equally useful.

ALAN J. RYAN

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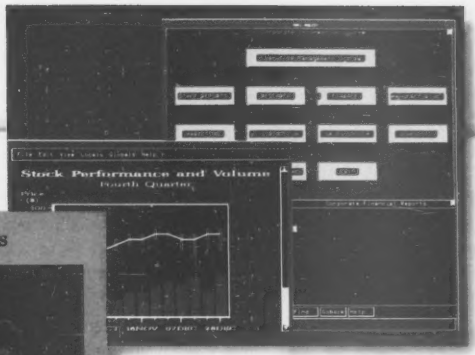
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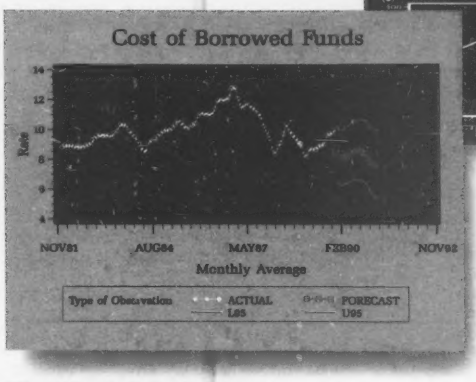
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Expertise landscape sparse

CONTINUED FROM PAGE 59

Their ideal goal is to retrain IS employees — many of whom are losing their jobs because of cutbacks and consolidations — into new networking roles.

"None of our data center staff is networking-oriented," says Bruce Russell, technology architect at Amex Life Assurance Co. in San Rafael, Calif. Over the past month, Amex has begun a process where departmental network administrators and managers have been instructing data center personnel a couple of hours a day "to take away the fear of change — of suddenly not controlling this big chunk of processing power."

Russell says that usually an outside consultant will have to train operations and database personnel because of the lack of in-house expertise.

"You're going to need consultants, like it or not," agrees Lydia Borgatta, director of telecommunications services at AGS Information Systems, a systems integrator based in Mountainside, N.J.

• Limited outsourcing. Some firms have had success contracting out pieces of their network management. However, "true" network outsourcing — which Borgatta defines as significantly reducing networking staff and offloading the capital investment of the network — has been stalled by the lack of network operational tools and in-house understanding of networks and their role in the business.

"There is no known history for an individual organization for the kinds of [network] problems they have or what's offloadable to an outsider," she says. "What is driving many of our customers crazy is that they have fairly high-salaried people doing fairly repetitive work. The industry needs good proactive diagnostics and problem-management tools" to automate these processes, as has been done in the "lights-out" data center.



Robert Maxham

American Cancer Society's *Naginey (right) and Ken Elder, vice president/CIO: a cautious approach*

Maynard says Young & Rubicam will continue to outsource, "but there is still a need for people to design, define requirements and speak as equals to consultants."

• Turning the IS manager into network overseer. Maynard says his director of MIS title no longer reflects his job. "The role of internetworking is now my main focus," he says.

"Instead of writing applications to support a U.S. business, like my job was six years ago, I'm worried about managing an international network of frame relay and Cisco routers and how to link HP to IBM to Novell to Apple," Maynard said.

• Shifting reporting structures. At International Paper Co. in Memphis, the telecommunications director now reports directly to IS chief Karl Moore rather than up through the computer operations manager.

Moore, vice president of information services, says he made the move six months ago because "I felt if telecommunications reported to me, it would get the much stronger attention it deserves."

• Technology to the rescue. Technology can sometimes assuage technology, helping developers not trained in networking intricacies to create network applications. Bill Conley, manager of information technology services at Loral Aerospace Corp. in Newport Beach, Calif., cites efforts such as the Open Software Foundation's Distributed Computing Environment (DCE) as "important reactions to chaos."

DCE is a set of integrated technologies with common programming interfaces that make the underlying networking schemes transparent to developers.

Conley still worries that the breakneck pace of networking technology change is leaving some IS shops in the dust. "I'm not sure the people exist yet who can get the data center uptime onto local-area networks," he says. "We're running headlong into downsized client/server cooperative processing before we are really ready for that technical environment."

• Look before you leap. Despite the gap of needed networking expertise, some large IBM shops still prefer a cautious approach. Making drastic changes in the skill sets of your staff, they warn, might do more harm than good in the long run.

"We're trying not to plan for technologies that aren't proven," says Chuck Naginey, director of MIS at the Austin, Texas-based American Cancer Society. "Otherwise, you get people on your staff who are unique. If they leave, you're really in trouble."



David Smart

International Paper's *telecom director reports to Moore*

Words to the wise

Systems integrator AGS Information Services estimates that 48% to 68% of Fortune 200 corporate technology budgets are slotted for telecommunications expenses.

With these substantial figures in mind, Lydia Borgatta, AGS' director of telecommunications, offers the following advice to chief information officers:

▶ Hire people from communications vendor environments "because they understand communications as a business that serves other businesses." Hone these staffers as internal consultants.

▶ Get a full inventory of end-to-end communications paths, from the data center to all users corporatewide. "This is critical because it tells you what your total capital investment is as a company, not just by department," Borgatta says. "It is that knowledge that tells you if outsourcing makes sense."

▶ Conduct a business operations review to determine what you must do as a corporation to maintain your communications network.

JOANIE M. WEXLER

CALENDAR

FEB. 2-8

Western Communications Forum. Anaheim, Calif., Feb. 3-5 — Contact: Western Communications Forum, Chicago, Ill. (312) 938-3500.

Information Management Conference. New York, Feb. 4-5 — Contact: The Conference Board, New York, N.Y. (212) 759-0900.

Speech Tech/Voice Systems '92. New York, Feb. 4-6 — Contact: Media Dimensions, Inc., New York, N.Y. (212) 533-7481.

Re-engineering: The Implementation Perspective. Dallas, Feb. 4-6 — Contact: Hammer & Co., Cambridge, Mass. (617) 354-5555.

Microtrends. Washington, D.C., Feb. 5-6 — Contact: The International Communications Industries Association, Fairfax, Va. (703) 273-7200.

FEB. 9-15

Computer Graphics '92. Orlando, Fla., Feb. 10-12 — Contact: Sheila A. McDonald, Frost & Sullivan, Inc., New York, N.Y. (212) 233-1080.

Networld '92. Boston, Feb. 11-13 — Contact: Annie Z. Scully, Bruno Bienheim Associates, Englewood Cliffs, N.J. (201) 346-1400.

Dexpo. Calgary, Alberta, Feb. 11-13 — Contact: Miller Freeman Expositions, Boston, Mass. (617) 232-3976.

FEB. 16-22

Information Security Managers Symposium. Si Diego, Feb. 18-20 — Contact: Pamela Bisset , MIS Training Institute, Framingham, Mass. (508) 879-7999.

CASE World Conference & Exposition. Santa Clara, Calif., Feb. 18-20 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

Seybold Seminars '92. Boston, Feb. 18-21 — Contact: Beth Sadler, Seybold Seminars, Malibu, Calif. (213) 457-5850.

FEB. 23-29

Annual Platforms For Computing (PC) Forum. Tucson, Ariz., Feb. 23-26 — Contact: Edventure Holdings, Inc., New York, N.Y. (212) 758-3434.

1992 International Help Desk Conference. New Orleans, Feb. 23-27 — Contact: Help Desk Institute, Colorado Springs, Colo. (719) 531-5138.

Software Development Spring '92. Santa Clara, Calif., Feb. 23-28 — Contact: Miller Freeman Publications, Inc., Santa Clara, Calif. (415) 905-2414.

Synoptics Users Group Conference. San Francisco, Feb. 24-26 — Contact: Amparo Lago, Synoptics Users Group, Santa Ciara, Calif. (408) 764-1073.

Macapp Conference. Orlando, Fla., Feb. 24-28 — Contact: Macapp Developers Association, Everett, Wash. (206) 252-6946.

MARCH 1-7

Share '92. Anaheim, Calif., March 1-6 — Contact: Pam Schur, Share headquarters, Chicago, Ill. (312) 822-0932.

Re-engineering: The Implementation Perspective. Cambridge, Mass., March 3-5 — Contact: Hammer & Co., Cambridge, Mass. (617) 354-5555.

Unix & Open Systems. Toronto, March 4-5 — Contact: Kal Juman, Datapro/Canada, North York, Ontario (416) 496-3131.

Computers in Libraries. Washington, D.C., March 4-7 — Contact: Meckler Conference Management, Westport, Conn. (203) 226-6967.

MARCH 8-14

Electronic Data Processing. Orlando, Fla., March 9-11 — Contact: Michael I. Sobol, MIS Training Institute, Framingham, Mass. (508) 879-7999.

CAD & Engineering Workstations '92 and Business Graphics. Anaheim, Calif., March 9-12 — Contact: National Computer Graphics Association, Fairfax, Va. (703) 698-9600.

Getting Maximum Business Value From Technology. New York, March 10-11 — Contact: The Conference Board, Inc., New York, N.Y. (212) 339-0290.

International Software Exchange '92. San Francisco, March 10-11 — Contact: Brian Eck, Juran Institute, Inc., Wilton, Conn. (203) 834-1700.

National Court Technology Conference. Dallas, March 11-15 — Contact: Dallas Convention and Visitors Guide, Dallas, Texas (214) 746-6677.

Hannover Faire CeBIT '92. Hannover, Germany, March 11-18 — Contact: Hannover Fairs USA, Princeton, N.J. (609) 987-1202.

Development Center Institute/Spring '92 Conference. Orlando, Fla. March 15-18 — Contact: Development Center Institute, Indianapolis, Ind. (317) 846-2753.

MARCH 15-21

National Software Engineering and Maintenance Conference. Washington, D.C. March 16-18 — Contact: Digital Consulting, Andover, Mass. (508) 470-3870.

EMEX '92. San Francisco, March 17-19 — Contact: The Interface Group, Needham, Mass. (617) 449-6600.

MARCH 22-28

PC Windows Conference. Toronto, March 23-25 — Contact: PC Windows/ Canada, International Conferences & Expositions, Inc., Toronto, Ontario (416) 581-8797.

DB/Expo'92. San Francisco, March 23-26 — Contact: Dan Wilson, Norm Ne Nardi Enterprises, Los Altos, Calif. (415) 941-8440.

MARCH 29-APRIL 4

Patricia Seybold's 1992 Technology Forum. Cambridge, Mass. March 31-April 2 — Contact: Patricia Seybold's Office Computing Group, Boston, Mass. (617) 742-5200.

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Windows applications

Not every Windows application is a good Windows application — to know one from the other, you need to check some behind-the-curtain criteria

BY ROBERT GARRETSON

Last year at this time, the 7-month-old Windows 3.0 from Microsoft Corp. was making all the industry headlines and riding an unprecedented wave of industry hype — not to mention ringing up sales that reached into the millions.

Today, neither of those conditions has changed. But there is a critical difference between then and now.

Now there are applications — and plenty of them. Not only were new applications announced in the past 12 months, but hundreds of popular DOS programs also hit the market in Windows attire.

Most important was the appearance of entrenched corporate standards, such as Wordperfect Corp.'s word processing package and Lotus Development Corp.'s 1-2-3. These were joined by Windows versions of Software Publishing Corp.'s top-selling Harvard Graphics and its closest challenger in presentation graphics, Lotus' Freelance. Such packages freed corporations to move to Windows without abandoning their existing standards.

Just as significant to many corporate buyers, 1991 spawned the second and third releases of many popular Windows applications, making them more palatable to organizations that needed the assurance of mature, stable products. Among the most notable are Microsoft's acclaimed Excel 3.0 spreadsheet; Lotus' Ami Pro 2.0 and Microsoft's Word for Windows 2.0 word processors and Release 2.0 of Lotus' highly regarded groupware product, Notes.

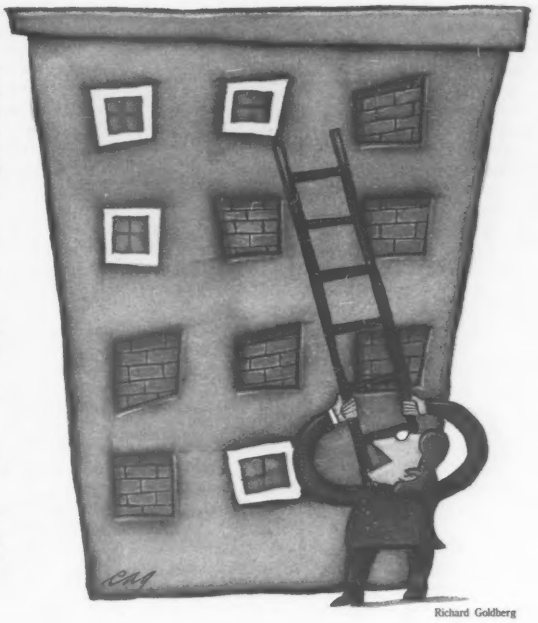
Still maturing

This is not to say the Windows application market has fully come of age. Indeed, there are still application categories ill-served by Windows, and buyers must still choose cautiously to get the most out of their entry into graphical computing (see stories page 66).

The fact is, graphical computing is more than painting a personal computer screen with pretty icons designed to be "friendly" to novices. The following are four criteria to look for when choosing a suite of Windows applications:

- Consistency with other applications.
- Means to customize applications to fit individuals' needs.
- The ability to integrate data and applications and break down artificial barriers between different programs.
- An accurate and capable what-you-see-is-what-you-get (WYSIWYG) display.
- Performance that's not perceptibly slower to seasoned DOS users.

If all this sounds too good to be true, it's because it probably is. But a carefully chosen suite of today's Windows applications can come pretty close.



Richard Goldberg

Count on good behavior

The most important thing Windows brings to the DOS PC table — particularly to information systems organizations supporting large numbers of PC users — is the consistency of behavior from one program to the next.

Though the Windows interface is still not as well-defined as the Apple Computer, Inc. Macintosh graphical interface, for example, it does provide a level of consistency across applications that can make them easier to learn, use and support than their character-mode counterparts.

With few exceptions, the F1 key always invokes Help, the Tab key always moves the cursor to the next modifiable field, and Shift-Tab always moves the cursor to the preceeding field.

Yet other, often basic operations such as copying, moving, deleting and printing files can vary among Windows programs. Application-specific functions such as replicating cells in a spreadsheet and copying text in a word processing document are even more prone to variation.

When kicking the tires of a Windows application, note how its behavior matches that of other Windows programs you have installed or are considering. For ultimate consistency, you can choose a suite of products from a single vendor. But you can also pick a primary application such as Excel, 1-2-3 or Wordperfect and use it as a benchmark.

As important as interface consistency is in a suite of Windows programs, not all users and not all applications are alike. Thus the latest generation of Windows applications have started to offer a means to customize interfaces and functions.

Microsoft's Excel and Word for Windows offer extensive macro facilities for that purpose, as does Lotus' Notes.

For more basic tailoring, Lotus has popularized the customizable icon palette, a user-definable version of the icon bar Microsoft applications first used to provide one-click access to frequently used functions.

Lotus' Smarticon palette in 1-2-3 and Ami Pro can contain macros as well as basic program commands and is invaluable in streamlining operations, particularly for advanced users who frequently invoke complex command strings. Microsoft and other developers are adding similar features to their programs.

Continued on page 66

Garretson is a free-lance writer based in Andover, Mass.

INSIDE

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Some applications run better in Windows than others. Page 66.

Product Guide
A comprehensive list of Windows-based word processors. Page 69.

Database Dilemma
There are some choices in this much maligned market. Page 72.

Behind-the-curtain criteria

CONTINUED FROM PAGE 65

Advanced users will also want to take advantage of Windows' mechanisms for integrating data and applications — Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE). Both are extremely useful for tying multiple applications together into a tightly knit suite.

DDE, which lets users create dynamic links between data contained in one Windows application and the same data used in another Windows program, is implemented in most full-fledged Windows applications.

The classic example of a DDE link is data cut from a spreadsheet and pasted into a word processing document. If the data in the spreadsheet is changed, the data in the word processing document is also updated.

Not all Windows applications implement DDE completely in both directions — meaning they can only receive data via a DDE link or can only supply data to another application via DDE. This can be a major shortcoming for users who work heavily with multiple applications and pass data frequently between them.

Giant step toward OLE

OLE, a more recent Microsoft innovation and still a rarity among Windows programs, essentially takes DDE a giant step further. Implemented in Microsoft Word 2.0 and its Solution Series of Windows applications, OLE allows application formats and functions themselves to be linked between two OLE-capable Windows programs.

Using the example above, selecting the linked data from within the word processor could call up the entire worksheet from which the data was drawn and even the spreadsheet program itself to further manipulate the data.

Like bidirectional DDE, OLE capabilities can be a real time-saver for users who work heavily with multiple applications. Those who work primarily with a single application may be satisfied with a solid DDE implementation. Though it has yet to be widely implemented and is not found in major products such as 1-2-3 for Windows and Wordperfect for Windows, OLE will likely find its way into most major Windows applications later this year.

Like DDE and OLE, applications' WYSIWYG capabilities can also vary, particularly in their ability to handle sophisticated typefaces or fonts. Most competent Windows programs do provide an adequate selection of fonts for on-screen display that precisely match those produced by a printer or other output device.

> AS MOST Windows users are painfully aware, its WYSIWYG graphics come at a price: performance.

The trick is to move highly formatted data from one application to the next or to and from different graphical environments. The absence of a standard font format, such as Adobe Systems, Inc.'s Postscript Type 1, prohibits true WYSIWYG capabilities across platforms and even threatens consistency among Windows programs.

The "font wars" that broke out in late 1989 (when Microsoft and Apple broke with Adobe to jointly develop their Truetype alternative to Postscript Type 1) have largely dissipated, but they have left a lingering cloud. Microsoft still plans to incorporate Truetype into its forthcoming Windows 3.1 release, and it remains to be seen what impact that will have on applications that already use Adobe fonts.

This should have little impact on the average Windows user. Those users who regularly create highly formatted graphical documents or have to exchange formatted information with other platforms need to look under the hood at the application's WYSIWYG engine.

As most Windows users are painfully aware, the environment's WYSIWYG graphics generally come at a price: performance. Users may grow impatient if they have to wait five seconds for a screen redraw every time a graphic is moved on a page of text.

The need for speed

The speed with which a Windows application moves bitmaps around the screen can determine — above all other features and functions — whether the program is serviceable for a seasoned DOS user. When putting a Windows program through its paces, watch for delays in the most common functions.

Even the fastest Windows applications are generally not as quick as their character-mode counterparts. This may be one reason that — while Windows 3.0 is enjoying unprecedented success, with 8 million copies shipped in the product's first 18 months — it still represents a relatively small fraction of the total desktop PC marketplace.

Windows has by no means won the battle of the desktop, and IBM's expected release of OS/2 2.0 early this year is bound to give it some stiff competition in the graphical market.

The impact of Microsoft's Windows 3.1 release later this year also remains to be seen. Its reportedly improved reliability, built-in Truetype fonts and other refinements could stimulate even more applications development, although some potential compatibility problems remain to be ironed out between the upcoming release and programs written for Windows 3.0.

However, if the current pace of Windows applications development activity is any indication, Microsoft's graphical environment is poised for even stronger growth in the months ahead. •

What's Hot

The Windows application explosion last year spanned virtually every major category and countless minor ones. But the most significant development was in applications demanding high-quality presentation, such as word processing, spreadsheets, presentation graphics, desktop publishing, network management and forms processing. These applications offer the best buying opportunities under Windows and generally boast the most mature products.

Utilities of all shapes and sizes also continue to spring forth, accounting for at least half of the new Windows programs released last year. DOS stalwarts such as the ubiquitous Norton Utilities from Symantec Corp. and Central Point Software, Inc.'s PC Tools appeared in Windows versions. Symantec's Norton Desktop led a multitude of utilities aimed at replacing Windows' much maligned File Manager.

Another high-volume category is development tools, for building either Windows programs or Windows front ends to corporate data and resources (see story page 68).

In addition to compilers, linkers, debuggers and other programming tools from most of the leading developers, mainframe connectivity applications frequently hit the best-sellers lists throughout the year. Terminal emulators such as Attachmate, Inc.'s Extra and Wall Data, Inc.'s Rumba are particularly popular for their ability to put easy-to-use graphical front ends on cryptic mainframe applications and data.

Of all the burgeoning Windows application categories, word processing and spreadsheets are the hotbeds of competition. That competition, among solid products from major vendors, is expanding the state of the art — not just for Windows software but for the applications in general.

Lotus' Ami Pro 2.0 and Microsoft's Word 2.0 offer significant functional advances, particularly in manipulating text and embedded graphics within a word processing document. Word 2.0, for example, introduced the ability to select blocks of text and drag them around a page with a mouse, just as Windows users have been capable of doing with graphics elements for many years.

Ami Pro and Word face a formidable challenge from a tardy but solid initial Windows release of Wordperfect's word processing package, with its large and loyal following.

A similar triumvirate is forming in spreadsheets, where the reigning champ, Microsoft's Excel, has been challenged by a Windows version of Lotus' 1-2-3 and Borland International, Inc.'s forthcoming release of Quattro Pro for Windows.

Excel, which is heading into its fourth generation, is generally viewed as the overall top performer, with an advantage over Lotus in graphing data and output quality. Lotus, however, still wields the marketplace clout of its vast installed base and appears to be maintaining its edge in underlying spreadsheet technology, such as multidimensional computation.

Borland, which has been nimbler than either Microsoft or Lotus in the spreadsheet market, is putting the finishing touches on what may end up as the slickest product of the three. Its innovative and intuitive "notebook" metaphor for representing spreadsheet data has been enthusiastically received by beta testers and spreadsheet pundits.

ROBERT GARRETSON

What's Not

Where Windows lags is in production-oriented, back-room applications. Database management systems, high-end accounting, project management, communications and networking either lack Windows versions of popular products or have failed to spark much buyer interest.

The biggest problem with DBMSs for Windows is the sparsity of them (see story page 72). Most notably missing are Windows versions of the top-selling PC products Dbase and Paradox from Borland International, Inc.

There is a fair selection of low-end accounting and project management packages targeted at small businesses but little at the high end. This is most likely because of weak demand in that category, since most heavy-duty, corporate accounting is for internal use and is not intended for output.

There is an ample number of Windows packages for asynchronous communications, but programs such as Digital Communications Associates, Inc.'s Crosstalk — a top seller under DOS — have rarely hit the top of the charts of Windows best sellers (see chart page 67). The cool reception is most likely attributable to the little added value a graphical interface brings to the transmission of data streams from one computer to another.

Most of the major remote-control communications packages such as Microcom, Inc.'s Carbon Copy and Norton-Lambert Corp.'s Close Up are also available in Windows versions. Some, such as Triton Technologies, Inc.'s Co/Session, have virtually solved the vexing problem of remotely controlling graphics-laden Windows screens with acceptable performance. Yet all these packages require at least 9.6K bit/sec. modems to achieve such performance, while 2,400 bit/sec. modems are still the most widely installed.

A couple of categories defy the principle that output-driven applications have flourished under Windows: computer-aided design (CAD) and the much hyped, as yet little realized, multimedia. The problem with CAD applications is that they are so graphical in nature, they make huge demands on systems performance without adding much beyond what they offer in DOS.

A handful of multimedia products incorporating sound and/or imaging did surface for Windows last year, but they were aimed at relatively narrow application niches such as video production or text-to-speech conversion. With Microsoft's release of Windows multimedia development tools last year and the upcoming release of Windows 3.1 early this year, the trickle of products may turn into a steady — if not overwhelming — stream later this year.

ROBERT GARRETSON

Aetna team scales above Windows obstacles

Project team develops application that will make better use of unrestricted memory areas

BY JOHN F. MCGROARY

Aetna Life and Casualty Co. in Hartford, Conn., hit the system resources wall early in its Windows application development efforts.

The insurance company's design team was charged with developing a complex application that would provide an automated guide to using Aetna's proprietary management decision-making process.

"The project was quite an introduction to Windows development for us," says project manager Michael Berstene, manager at Aetna Information Technology. "We were charged with developing not only one of the early Windows applications but also one which tested some of the limits of the Windows environment."

Aetna's application required numerous text windows to be presented to the user in a series of screens, each of which represented a step in the management decision-making process — exactly the type of application that strains Windows' system resource capacity.

Lingering limitations

Although Windows represents a major advance over DOS by providing a graphical user interface and multitasking, it still relies on DOS as its base operating system. As such, it is saddled with some of the limitations of DOS, such as a 64K-byte segment limitation.

Data entry and text-intensive applications are particularly susceptible to this constraint because they require a large number of what Windows refers to as system resources. Unfortunately, Windows itself is also limited to 64K-byte areas in which to store system resources.

This limitation — not the amount of physical memory on the machine — is the true constraining factor for a personal computer running Windows. More often than not, a Windows memory error encountered when starting an application is a result of a lack of system resource space rather than a lack of available memory.

While many business applications will test the system resource constraint, all is not lost.

At Aetna, the project team "had two technical obstacles to overcome," Berstene explains. "One was to keep system resource requirements to a minimum; the other was to shift memory use from the restricted 64K areas to the unrestricted memory areas." Berstene's group achieved the first goal by designing a system that created system resources as they were needed and destroyed them when they were no longer required.

The team did this by employing a "shadowing" technique. As the user navigates through the application, the next screen requested is built behind — or in the shadow of — the currently displayed screen. When the new screen is ready for display, it is moved in front of the current screen. The previously displayed screen is then destroyed.

Shifting memory use was more difficult to achieve. Using their knowledge of the inner workings of Windows, the design team members were able to "coerce" Windows into making greater use of the unrestricted memory areas.

These functions allow data and text window information to be stored in the unrestricted global memory areas rather than in the application's local data segment, which is subject to the 64K restriction. The application's performance is now sharply improved.

Windows does present some limitations to developers, but Aetna's success in overcoming them proves that they are not insurmountable. Microsoft Corp.'s New Technology/Win 32 will provide the ultimate solution to the system resource problem: elimination of the archaic 64K-byte barrier. •

McGroary is president of The Aristos Co., a West Hartford, Conn.-based Windows and OS/2 consulting firm.

Best-sellers

Top 10 applications, based on a three-month average of major retailer sales, taken in November

1	Microsoft's Excel
2	Microsoft's Word for Windows
3	Berkeley Systems' After Dark
4	Symantec's Norton Desktop for Windows
5	Adobe's Type Manager
6	Lotus' 1-2-3 for Windows
7	Microsoft's Office for Windows
8	Microsoft's Entertainment Pack
9	Aldus' Pagemaker
10	Microsoft's Works for Windows

Note: Wordperfect for Windows was not yet shipped when figures were collected

Source: *Windows Watcher Quarterly*
CW Chart: Marie Haines

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- Powersoft

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- ***Product Comparisons: Strengths, Weaknesses and Commentary*** by Conference Chairman Jeff Tash, Database Decisions

Technical Presentations

- ***Executive GUI Design*** by Christine Comerford, Corporate Computing, Inc.
- ***Windows "Stuff": MDI, DDL, DDE, OLE*** by Kim Crouse, Synaptix
- ***Beyond CUA, Setting Corporate Standards*** by Christine Comerford, Corporate Computing, Inc.
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WINDOWS

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There's something for all in applications generators

BY HOWARD MILLMAN

Microsoft Corp.'s Windows well deserves the unprintable aspersions programmers use to describe the financial, cerebral and professional demands of this programming for Windows experience. Nevertheless, the soaring popularity of this operating environment has fueled a demand for Windows applications to be created faster. The answer is applications generators.

Millman is a consultant in Croton, N.Y., who implements engineering and project tracking applications for universities and hospitals.

Whatever your level of expertise, degree of commitment or objective in terms of end-product performance, you can find a Windows-based applications generator to meet your needs. Available tools can range in price from $150 to $700; can take anywhere from one day to one month to learn; and can range from a simple electronic forms generator to a Goliath relational database manager. Here's a look at the top sellers in the market:

▶**Borland International, Inc.'s Objectvision 2.0** ($150) is the perfect development tool for the true nonprogrammer. Using a visual flowchart metaphor for programming, its Decision Trees allow users to control logic flow by selecting from predefined spreadsheet-type functions and commands and then displaying them as organization-like boxes linked by arrow-tipped lines.

Features new to Version 2.0 include Event Trees, which govern menu bar customization, allow increased control over responses to commands and feature a runtime module. The new version also provides Object Linking and Embedding plus Dynamic Data Exchange support along with enhanced forms editing tools.

One trouble with Objectvision is that because it uses a high-level language, performance is sluggish. While building complex applications, screen updates require as long as 40 seconds on a 1M-byte Intel Corp. 80286-based personal computer. Switching to a 4M-byte 80386 reduces this to about 3 seconds — still slow enough to be noticed. A runtime compiler, rumored for future releases, should help speed up performance.

▶**Microsoft's Visual Basic** ($199) requires more programming knowledge than Objectvision; it is about on par with Microsoft's Quick Basic. It also provides more flexibility, with nearly 100 available third-party add-on modules, also called Dynamic Link Libraries. These enable users to do things such as access IBM, Digital Equipment Corp. and Groupe Bull systems, telecommunications modules, predesigned SQL databases and image processing.

If you are slightly adventurous and have the time, you can also use Visual Basic's features for the job. Object properties (size, color, shape and location) are selected from a menu, and you enter Visual Basic's programming code the old-fashioned way — keying it in line by line. The code resembles a superset of the Quick Basic language enhanced for graphics.

Although Visual Basic's compiled applications still lag behind DOS applications, they rank among the fastest.

▶If you need to create a relational text or image environment, **Asymetrix Corp.'s Toolbook 1.5** ($395) provides a polished interface and a competent set of tools especially suitable for creating hypertext and multimedia applications.

Toolbook is intended for in-house applications developers as well as independent software vendors. Openscript, its visual, object-oriented programming language, is similar to Hypercard in the Apple Computer, Inc. Macintosh environment and will ring a bell for Pascal programmers.

Compared with Objectvision, Toolbook offers more control over data relationships (especially text), the appearance of the graphics interface and built-in integrated text and graphics editors as well as a debugger. As with Visual Basic, a large and growing library of add-ons is available.

For building multimedia applications, the Multimedia Toolbook ($695) directly controls hardware or software compatible with the Microsoft Windows Media Control Interface.

▶**The Whitewater Group, Inc.'s Actor Professional** ($495) is an advanced

Continued on page 72

Market dominators

Estimates vary, but many market research firms say six software packages account for about 70% of the total applications development packages sold. These include Borland's Turbo Pascal for Windows, C++ 2.0 and Objectvision; and Microsoft's Quick C for Windows, Visual Basic and the C 6.0/Software Developer's Kit combination.

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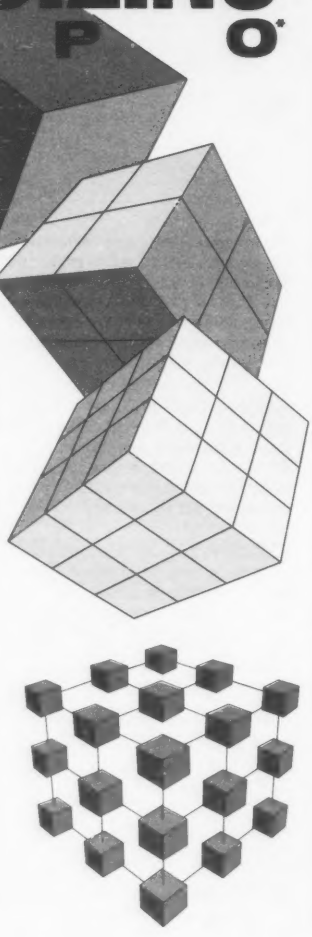
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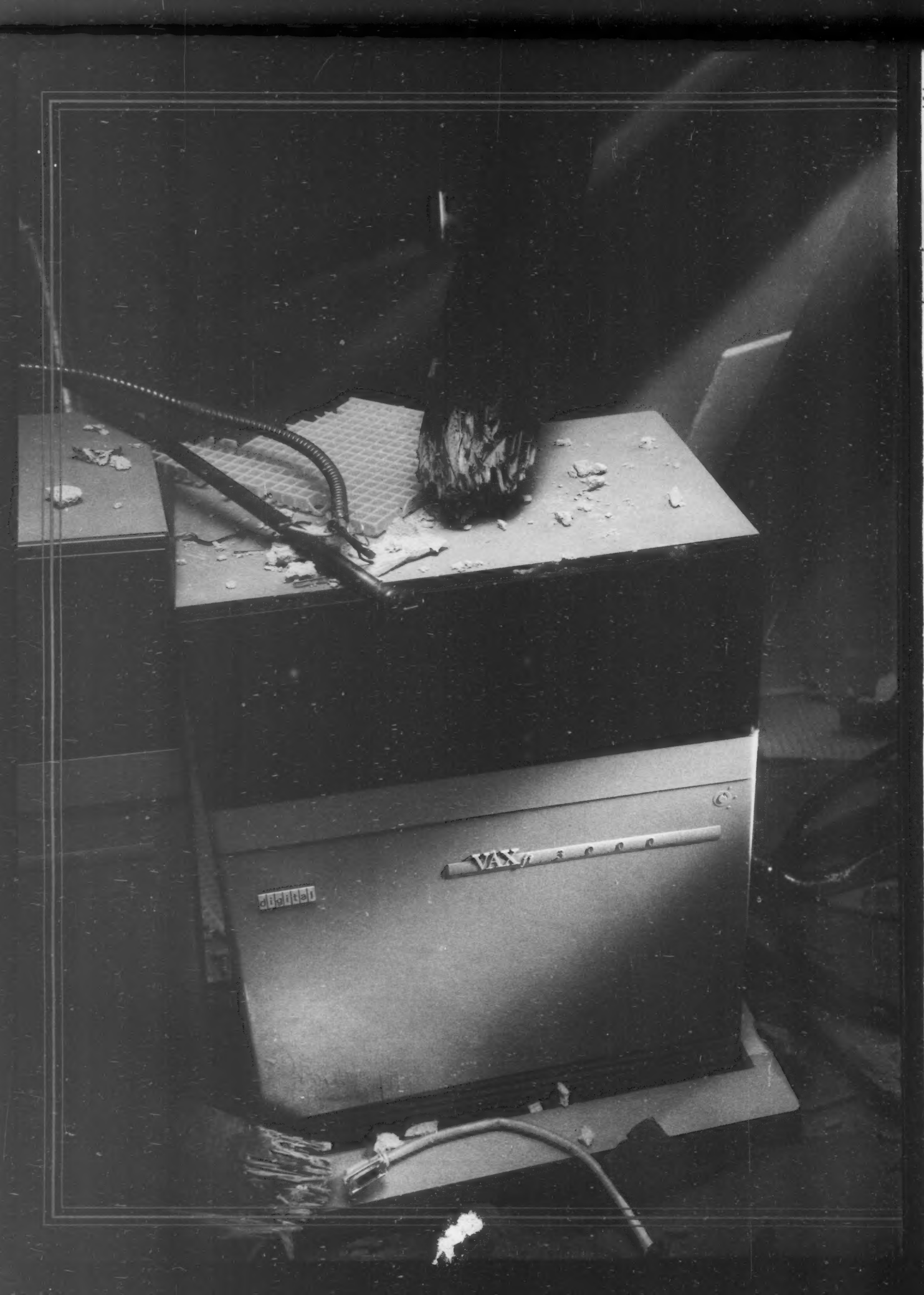
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Windows-based word processing software

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Computer Associates International, Inc.[4] (516) 227-3300 (800) 543-3603	CA-Textor	IBM PCs and compatibles	Windows 3.0	1M/2M	1.5M - unlimited, 3M recommended	DDE	Yes	Yes	8	Menu-based	Spell checker, search and replace, undo function, foreign language dictionary, table tool	Table of contents	Yes	ASCII, Wordperfect, Microsoft Word (DOS), DCA/DIA RFT, RTF, Supercalc	PIC, CGM, TIFF, PCX	No	Thesaurus, text retrieval capabilities, mail merge	$225 per user
Describe, Inc. (916) 646-1111	Describe Word Processor Version 3.0	IBM PCs and compatibles	OS/2 Versions 1.2, 1.21, 1.3, 2.0, Windows 3.0	3M/4M	2M - 7M, 3M recommended	DDE	Yes	Yes	Unlimited	Both	Split screen editing, spell checker, search and replace, undo function, foreign language dictionary, definitions	Both	No	ASCII, DBF, DIF, WKS, WKI (imports/exports), Ami Pro, Lotus' 1-2-3 1A or later, Microsoft Richtext, Microsoft Word 3.0 or later, Wordperfect 4.1 or later, Wordstar 3.3 or later (exports only)	PIC, CGM, TIFF, WMF, AT&T (imports only)	Yes	Thesaurus, text retrieval capabilities, mail merge, unlimited undo functions, drawing features	$495 includes word processor, $395 per user
Eastern Language Systems, Inc. (801) 377-4558	Alkastib International (Arabic/multilingual word processor)	IBM PCs and compatibles	DOS 3.1 or later, Windows 3.0 or later	1M/2M	2M - 7M, 4M recommended	Neither	No	No	3	Both	Search and replace, undo function, shows markers, automatic page numbering	Neither	No	ASCII, ASMO (Arabic text format)	BMP, PCX (imports only)	Yes	Simultaneous Arabic/English text entry, right and left originating cursor	$495 includes word processor, dual media 3½-in., 5¼-in. diskettes, keyboard template, user's manual, Adobe Type Manager, software key, keycap stickers (non-Middle East orders)
	Vazhe Negar (Persian/ multilingual word processor)	IBM PCs and compatibles	DOS 3.1 or later, Windows 3.0 or later	1M/2M	2M - 7M, 4M recommended	Neither	No	No	3	Both	Search and replace, undo function, shows markers, automatic page numbering	Neither	No	ASCII, ASMO (Arabic text format) (imports/exports)	BMP, PCX (imports only)	Yes	Same line Persian/English text entry, both right and left cursor	$495 includes word processor, dual media 3½-in., 5¼-in. diskettes, keyboard template, user's manual, Adobe Type Manager, software key. keycap stickers (non-Middle East orders)
Lotus Development Corp. (404) 851-0007 (800) 831-9679	Ami Pro	IBM PCs and compatibles	DOS 3.0 or later, Windows 3.0 or later	1M/2M	6M - 11M, 11M recommended	Both	Yes	Yes	9	Menu-based	Spell checker, search and replace, undo function, foreign language dictionary	Both	Yes	ASCII, DBF, DIF, WKS, WKI, Wordperfect, Microsoft Word, Displaywrite, Wordstar, Excel, Manuscript, Paradox, Multimate	PIC, CGM, TIFF, HPGL, Windows, Bitmap, Metafile, Drawperfect, Freelance, Ami Draw, Ami Equation	Yes	Thesaurus, mail merge, revision maker, master document, charting, drawing, image processing, collapsible outliner	$495 includes word processor, $395 per user (network version)
Maxthink, Inc. (510) 540-5508	Hyper Note Pad	IBM PCs and compatibles	Windows 3.0	50K/ 100K	30K - 500K, 200K recommended	Neither	Yes	No	1	Both	Undo function, hypertext linking	No	No	ASCII	PCX (imports only)	No	Text retrieval capabilities, hypertext lines among all files	$489 includes word processor (network version)
Microsoft Corp. (206) 882-8080	Word for Windows 2.0	IBM PCs and compatibles	DOS 3.0, Windows 3.0	2M/2M	5M - 15M	Both	Yes	No	9	Both	Split screen editing, spell checker, search and replace, undo function, foreign language dictionary, grammar correction	Both	Yes	ASCII, DBF, WKS, WKI, Wordperfect 4.1 or later, DCA/RFT, RTF, Microsoft Word 4.0 or later, Wordstar 3.0 or later	CGM, TIFF, EPS, HPGL, PCX, Bitmap, Windows, Metafile	Yes	Thesaurus, text retrieval capabilities, mail merge, charting, drag and drop text and graphics, OLE, print merge helper, help for Wordperfect users	$495 includes word processor, $129 for upgrade from DOS to Windows
Microsystems Engineering Corp. (708) 882-0111	Wysiword	IBM PCs and compatibles, Unix workstations, Macintosh, Decstation, Sun	Windows 3.0, Ultrix, Decwindows	2M/3M	2.3M - unlimited, 2M recommended	Neither	No	Yes	4	Menu-based	Split screen editing, spell checker, search and replace, undo function, tables macros	Neither	No	ASCII, DBF, DCA	PIC, PICT, CGM, MDL, BMP	Yes	Thesaurus	$895 includes word processor, drawing, plotting, $1,395 (workstation version)
NBI, Inc. (303) 444-5710	Legacy 2.0	IBM PCs and compatibles	DOS 3.0, Windows 3.0 or later	1M/2M	10.5M - unlimited, 20M recommended	DDE	Yes	No	1	Both	Split screen editing, spell checker, search and replace, undo function, foreign language dictionary, grammar correction	Both	Yes	ASCII, WKS, WKI, Wordperfect, Microsoft Word, Wordstar, Ami Pro, IBM Displaywrite, Multimate, Advantage, Microsoft RTF	PIC, CGM, TIFF, IPS, BMP, HPGL, PCX, WPG, WMF	Yes	Thesaurus, text retrieval capabilities, mail merge, color image processing, floating frames	$495 includes word processor, $195 per user
Paisoft (512) 854-8788	Wintext	IBM PCs and compatibles	DOS 3.3, all Windows versions up to but not including 3.0	512K/ 640K	720K recommended	Neither	No	No	2	Both	Split screen editing, spell checker, search and replace, undo function	Neither	No	ASCII	PIC, TIFF	No	Mail merge	$195 includes word processor, one 5¼-in., one 3½-in. disk, user's manual
Software Publishing Corp. (408) 986-8000	Professional Write Plus	IBM PCs and compatibles	Windows 3.0	1M/2M	3.5M - unlimited, 4M recommended	DDE	Yes	No	1	Both	Spell checker, search and replace, undo function, foreign language dictionary, grammar correction	Neither	No	ASCII, DBF, DIF, WKS, WKI, Wordperfect, Microsoft Word	PIC, CGM, TIFF	No	Thesaurus, mail merge	$249 includes word processor (network version), $65 for upgrade from DOS to Windows
Spinnaker Software[5] (617) 494-1200	PFS: Windowworks	IBM PCs and compatibles	DOS 3.1 or later, Windows 3.0	1M/2M	1.5M - 4M, 2M recommended	Neither	No	No	7	Menu-based	Spell checker, foreign language dictionary, grammar correction	Both	Yes	ASCII, WKS, WKI, CVS	TIFF, BMP, PCX, PCC	Yes	Thesaurus, mail merge	$199 includes word processor, database, spreadsheet, label maker, chart editor, communications software, $79 for upgrade from DOS to Windows
Symantec Corp. (408) 253-9600	Justwrite	IBM PCs and compatibles	Windows 3.0	2M/4M	3M - 5M, 5M recommended	DDE	Yes	Yes	8	Both	Spell checker, search and replace, undo function	Both	Yes	ASCII, DBF, most word processing formats	PIC, PICT, TIFF, PCX, WMF, HPGL, BMP	No	Thesaurus, mail merge, automatic file conversion, table editor	$199 includes single-user license, disk set, full warranty, technical support, $79 for upgrade from DOS to Windows

[1]Dynamic Date Exchange. [2]Object Linking and Embedding. [3]Multiple Document Interface. [4]Will begin shipping product first quarter of 1992. [5]An integrated set of products.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Contact vendor for further product information.


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Wordperfect Corp. (801) 225-5000 (800) 451-5151	Wordperfect 5.1 for Windows	IBM PCs and compatibles, Unix workstations, Macintosh	Windows 3.0	2M/4M	8M - unlimited, 10M recommended	DDE	No	Yes	9	Both	Split-screen editing, spell checker, search and replace, undo function, foreign language dictionary	Both	No	ASCII, Ami Pro, Microsoft Word, Wordstar, Multimate, IBM DCA/FFT, IBM DCA/RFT, RTF, Xywrite, ANSI, Displaywrite	PIC, PICT, CGM, TIFF, PCX, BMP, PPIC, WMF, EPS, HPGL, WPG, DHP, DXF, GEM, IMG, MSP	Yes	Thesaurus, text retrieval capabilities, mail merge	$495 (network version), $495 includes word processor (stand-alone), $99 for upgrade from DOS to Windows
Wordstar International, Inc. (415) 382-8000	Wordstar for Windows	IBM PCs and compatibles	DOS 3.1 or later, Windows 3.0	2M/2M	7M - unlimited, 20M recommended	DDE	Yes	No	1	Both	Spell checker, search and replace, undo function, foreign language dictionary, grammar correction	Both	No	ASCII, DBF, DIF, WKS, WKI, Wordstar, Legacy, Wordstar 3.3 or later, Wordperfect 4.1 or later, Microsoft Word 3.0 or later, Microsoft Windows Write, Ami Pro	CGM, TIFF	No	Thesaurus, text retrieval capabilities, mail merge, page layout	$150 per node, $495 includes word processor (network version), $129 for upgrade from DOS to Windows

Something for everyone

CONTINUED FROM PAGE 68

tool set with an object-oriented, computer-aided software engineering-like environment. It is capable of creating expandable, focused and very powerful applications for professional programmers. Consequently, Actor demands proportionately more training time than either Objectvision or Toolbook.

Actor allows users to develop applications on several skill levels, from slightly above neophyte to advanced rocket scientist. Although it offers an excellent, printed tutorial fully detailing the intricacies of object-oriented programming, online, context-sensitive Help would be a welcome addition.

Actor offers users the option of creating their own objects (including text, numbers, radio buttons, dialog boxes, menus and all event-driven objects) or adopting and adapting the 100+ reusable objects in the Object Windows Library.

There are three criteria to balance when choosing an application generator: time to develop, time to execute and extensibility. The package you choose will depend on your degree of familiarity with Windows programming techniques, how much more of your time you will devote to learning new methodologies and the type and sophistication of applications you want to develop.

For example, while all application generators will create databases, some (such as Multimedia Toolbook and Actor) are equally adept at handling text, sound and graphics. •

DBMSs for those who can't wait for 'killer apps'

BY HOWARD MILLMAN

In the much maligned and slow-to-develop Windows database market, many potential purchasers are biding their time until the software giants — Borland International, Inc., Microsoft Corp. and Lotus Development Corp. — announce their "killer applications." Borland says it will release Windows versions of Paradox or Dbase in the first quarter and first half of this year, respectively. Mum's the word from the other two.

Other database publishers have evidently decided it's time to stop testing the waters and start making waves. Although off to a slow start, the trickle of solid products, such as Ace Software Corp.'s Acefile and Software Product International's Windowbase, could turn into a deluge.

These new databases broaden the range of choices in a market that has been dominated by two veterans — Blyth Software, Inc.'s Omnis 7 and Software Publishing Corp.'s Superbase IV, both robust, expensive applications aimed at the sophisticated user who needs to build Texas-size databases.

Acefile 1.0 ($295) and Windowbase ($495) are less complex, achieving at least some of their simplicity by excluding formal procedural programming languages and relational files. If you can get along with linked files and a script programming language, these exclusions result in lower cost and less complex programs.

▶**Acefile** has macro-like scripts and file linking and can also directly read and write Dbase files and indexes. Using built-in graphics, it will generate two- or three-dimensional pie, line and bar charts created with data drawn from tables. Acefile also networks easily and supports multiple levels of record locking.

▶For its part, **Windowbase 1.0** supports SQL, creating SQL scripts with either a mouse-click recording technique or directly entered commands. It also supports a wide variety of default forms and reports and one-to-many relationships and customizable menus. Windowbase also makes an excellent dialogue-based SQL tutor that builds stand-alone applications.

The current version of Windowbase lacks network support abilities, although Software Products International promises a runtime module in the first quarter of this year and network support later in the year.

▶Computer Associates International, Inc. also offers one of the simpler databases — a rerelease of Gensoft Development Corp.'s Dbfast, renamed **Dbfast for Windows.** Dbfast for Windows ($550 for a single-user version) is now a fully graphical hybrid that's at home in both the application and database development realms. It is also language-compatible with Dbase.

Programs with gusto

If you need to go the more robust route, **Omnis 7** and **Superbase IV** are your choices. There is not a lot of functional difference between the two programs. Neither imposes limitations ever likely to be reached by mere mortals, allowing 1 billion records per file, unlimited files and up to 999 simultaneously open indexes.

Both use proprietary, procedural (non-Dbase) programming languages. Omnis uses predefined object-like modules to build its event-driven routines, and scripts can be assembled from point-and-click selections or built directly from keyboard-entered data.

Superbase IV's programming language resembles a superset of Basic. Easier to understand because of its English-like terminology, it contains more than 220 commands, many designed to take advantage of Windows' graphics.

Both applications will handle images as well as audio through the use of Binary Large Object Blocks.

The price of Blyth's Omnis 7 — from $1,250 to $2,500 per copy plus runtime licenses — reflects its targeted users: experienced independent and in-house corporate developers.

Software Publishing positions and prices Superbase IV to appeal to a broader audience that includes independent and in-house end users, plus corporate developers. At $695 plus runtime licenses, it is expensive by DOS standards but not for a Windows application.

With the variety of Windows databases already available — from simple stand-alone card-type files to integrated text/image behemoths — there seems to be only one reason to wait for the "killer apps": the hope of accelerated performance. Otherwise, you probably won't see some previously unknown collection of features or lower costs down the road. •

ASK THE VENDOR

"I use Aldus Pagemaker 4.0, and I would like to know when they will have a filter for Microsoft Word for Windows 2.0." — *David Howell, IS manager, PED Manufacturing*

The filter driver pack is under development and will be released during the first quarter of 1992. — *Ben Rotholtz, Pagemaker program manager, Aldus Corp.*

"When is Cognos' Powerplay going to support SQL?" — *Ken Krallman, Carleton Technologies, Inc.*

SQL databases are not optimized to service the kind of multidimensional requests common in Powerplay 2.0. As a result, it is not currently possible to create the interactive drill-down and exploration capabilities of Powerplay and also run live against a SQL database.

Our strategy in the short term is to rely on SQL query tools, such as Cognos' companion product to Powerplay, called Impromptu, to do the extraction for Powerplay. Users then have the added advantage of using Impromptu to make detailed queries against higher level trends that are revealed in Powerplay. — *Robin McNeill, director, Powerplay products, Cognos, Inc.*

Last time, it was the experts' choice. This time, it's the easy choice.

The new IRMA WorkStation for Windows 1.1

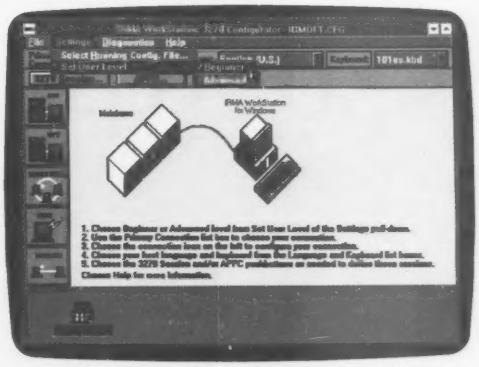
From the very beginning this 3270 emulation software was the No. 1 choice of experts like the editors of *PC Magazine*. It brought a host of sophisticated features into the wonderful world of Windows™ connectivity. But it was only the start.

PC MAGAZINE EDITORS' CHOICE
February 26, 1991
IRMA WorkStation for Windows, Ver. 1.0

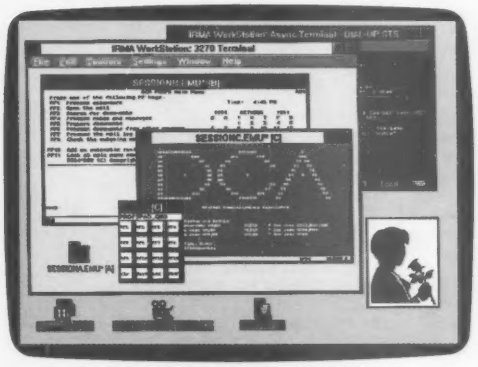
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Once installed, our new software is easier to operate, too. Using the familiar Windows Multiple Document Interface (MDI), you get the easy efficiency of managing multiple sessions with a single menu bar.



Installation couldn't be easier! The new Intelligent User Assist automatically senses the communications adapter in your PC. A Configurator Screen shows your PC and its connection to the mainframe.



Multiple Document Interface (MDI) lets you manage multiple communications sessions with a single menu bar in the main 3270 terminal emulation window.

Integrating mainframe data into your other Windows applications is no problem either. You'll find a breadth of application integration tools like macros, QuickScript™ with DDE, HLLAPI and APPC.

Just as important, with this IRMA software package, you can get into "Windows" connectivity no matter how you're connected. There's CUT, DFT, SDLC, token-ring and asynchronous connections. And what's more, IRMA WorkStation for Windows can now even act as client software for DCA®'s IRMALAN™/*EP* 3270 NetBIOS gateway. No one offers as many connectivity options!

It's even easy to try!

Trying out the new IRMA WorkStation for Windows 1.1 is as easy as asking for your **FREE DEMO DISK.** Better yet, you can trade-up from any other 3270 connectivity software for only $125. If you're an existing IRMA WorkStation for Windows user, you can upgrade for only $95!



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IRMA WorkStation for Windows
Another Communications Solution From
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COMPUTERWORLD



1992 Computerworld Editorial Calendar (January-June)

Issue Date	Ad Closings Color*	Ad Closings B/W	Editorial Feature	Show Distribution	Ad Readership Issue	Response Card Decks
Jan. 6	Dec. 20	Dec. 27	**Executive Report:** The Information Systems Contribution to Quality			
Jan. 13	Dec. 27	Jan. 3	**Product Spotlight:** Windows Applications			Mails: Jan. 15 Space Close: Dec. 6 Mat'l Close: Dec. 9
Jan. 20	Jan. 3	Jan. 10	**Executive Report:** Customer Service **Industry Closeup:** Automotive Industry			
Jan. 27	Jan. 10	Jan. 17	**Product Spotlight/Buyers' Scorecard:** LAN Management	Communication Networks Jan. 28-30 Washington, D.C. Windows OS/2 Jan. 28-30, San Jose, CA	Harvey Study	
Feb. 3	Jan. 17	Jan. 24	**Executive Report:** Using IS for Fast Track Product Development			
Feb. 10	Jan. 24	Jan. 31	**Product Spotlight:** E-Mail	Networld Feb. 11-13, Boston	Starch Study	Mails: Feb. 12 Space Close: Jan. 3 Mat'l Close: Jan. 6
Feb. 17	Jan. 31	Feb. 7	**Executive Report:** Beyond Sales Force Automation			
Feb. 24	Feb. 7	Feb. 14	**Product Spotlight/Buyers' Scorecard:** Accounting Systems			
Mar. 2	Feb. 14	Feb. 21	**Executive Report:** To Be Announced			
Mar. 9	Feb. 21	Feb. 28	**Product Spotlight:** Client/Server Application Development		Starch Study	Mails: Mar. 11 Space Close: Jan. 31 Mat'l Close: Feb. 3
Mar. 16	Feb. 28	Mar. 6	**Integration Strategies:** Pulling Macs Into the Enterprise Network **Industry Closeup:** Aerospace			
Mar. 23	Mar. 6	Mar. 13	**Product Spotlight/Buyers' Scorecard:** RISC Desktop Machines and Servers	DB Expo Mar. 23-26 San Francisco	Starch Study	
Mar. 30	Mar. 13	Mar. 20	**Executive Report:** To Be Announced			
Apr. 6	Mar. 20	Mar. 27	**Product Spotlight/Buyers' Scorecard:** PC Software—Fresh Application Categories and New Twists on Old Ones	Comdex Spring '92 and Windows World Apr. 6-9, Chicago		
Apr. 13	Mar. 27	Apr. 3	**Executive Report:** To Be Announced			Mails: Apr. 15 Space Close: Apr. 3 Mat'l Close: Apr. 6
Apr. 20	Apr. 3	Apr. 10	**Product Spotlight:** Printers Best Suited for a LAN Environment			
Apr. 27	Apr. 10	Apr. 17	**Executive Report:** To Be Announced		Starch Study	
May 4	Apr. 17	Apr. 24	**Product Spotlight:** Midrange Systems That Run Enterprises			
May 11	Apr. 24	May 1	**Integration Strategies:** Creating an "Open" Company **Industry Closeup:** Personal Care Industry		Starch Study	Mails: May 13 Space Close: Apr. 3 Mat'l Close: Apr. 6
May 18	May 1	May 8	**Product Spotlight/Buyers' Scorecard:** Routers	Interop East May 18-22 Washington, D.C.		
May 25	May 8	May 15	**Executive Report:** To Be Announced			
June 1	May 15	May 22	**Product Spotlight:** What the Well-Equipped Help Desk is Using			
June 8	May 22	May 29	**Product Spotlight:** MRP II			Mails: June 10 Space Close: May 1 Mat'l Close: May 4
June 15	May 29	June 5	**Special Edition:** Annual *Premier 100* Magazine (Ad Close: May 1) **Executive Report:** To Be Announced			
June 22	June 5	June 12	**SPECIAL SUPPLEMENT:** *Computerworld's* 25th Anniversary **Product Spotlight/Buyers' Scorecard:** Portable Computing (laptops, notebooks, pen-based and wireless technologies)	PC Expo June 23-25 New York City AIIM June 22-25 Anaheim	Starch Study	
June 29	June 12	June 19	**Executive Report:** To Be Announced			

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Avoid buyer remorse

CASE will only live up to expectations if the tool you choose fits the developers' needs. We invite you to put your target products to the test



Russell O. Jones

BY GARY LANSMAN

You've been told that CASE tools will change your developers' lives forever. Their productivity rates will soar, they'll be happier than they've ever been and the chief executive officer will come down from mahogany row to thank you, the information systems chief, for all the business-driven applications your group has developed so quickly.

The sad fact of the matter is, however, this wonderful scenario rarely occurs because so many IS managers just don't put the right computer-aided software engineering (CASE) tools in place. They fail to understand the kinds of CASE tools their developers need.

What would help this situation greatly is a selection process that starts with a careful analysis of developer needs and progresses to a CASE tool evaluation, with the goal of finding a compatible match.

There are a dozen key areas of import to developers when it comes to CASE tools: ease of use, requirements definition, design, programming, testing, database, runtime, computer environment, documentation, documenting capability, change management and financial analysis. To this basic list you can add qualifications specific to your environment.

You should weight each area in terms of importance to your developers and then judge individual CASE tools on how well they meet your requirements. For example, if your systems are typically installed with significant errors that adversely affect staff and customers, developers will need a tool strong in the areas of analysis and testing.

Weighting should not be used as an excuse to shorten the evaluation list, however. If you're contemplating skipping over a few of the measures, don't; I've found that in every instance in which a CASE tool implementation has failed, one or more of the basic criteria has been ignored. One company I know of purchased a CASE tool on the basis of price alone (its cost had been reduced), ignoring all other criteria. The CASE project went bust, but only after three developers spent eight months doing intensive work on it. To make matters worse, the project manager and a very experienced developer left the company. The CASE tool has not been used since.

That situation doesn't have to happen to you. Here's a rundown of the 12 areas by which to judge your CASE tools, including exercises to do to ensure that your evaluation is complete:

Lansman is a project manager at Bank of America in Oakland, Calif. He has spearheaded a variety of CASE projects since the early 1980s.

Ease of use

A common failing of many system development tools is impediments built into the human interface. Developers want CASE tools that support and accelerate their natural thought processes.

Screen and command clarity, for instance, has become a particularly important feature with the advent of graphical user interfaces (GUI). Increasingly, workstations with GUIs are distributed development platforms linked to host-based CASE tools. Each GUI has standards for function key assignment, button functions, menu bar arrangement and Help facilities.

Exercise
Ease of use

Ask the following questions for the categories below when evaluating CASE tools on ease of use:

- **Batch.** Can work such as compiles be submitted to batch while developers work interactively? Do batch tasks affect interactive development?
- **Consistent interface.** Are interface styles consistent across all functions?
- **Error messages.** Does the tool employ techniques such as the use of buttons, dialog boxes and menu items to prevent errors? When errors do occur, does the tool provide error messages?
- **Expert/novice mode.** Does the tool provide an expert mode (typically command-driven) as well as a novice mode (typically menu-driven)? You may need to search for a tool that can handle the different skill levels of your developers.
- **Abbreviations.** Are abbreviations available for commands typically used in expert mode?
- **Function keys.** Does the tool incorporate program function keys to accelerate function execution? Does it make standard function key assignments (e.g., F1 = Help)? Can you dynamically assign functions to function keys (e.g., macros)?

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- **Help.** Is help available on demand, and is it indexed by topic?
- **Graphical user interface.** Does the tool have menus and/or menu bars, and are these clear, well-organized and consistent? Are dialog boxes used to identify choices for single or multiple selection? Can the developer open two windows so that information in one window can be referenced while working in another?
- **Navigational aides.** Would system developers be able to navigate screens easily to obtain information they need? You could base your judgment here on criteria such as whether there is a cross-reference for data use or a map to guide developers through screens.
- **Tailoring.** Can screens and other tool features be tailored to meet individual developer needs?
- **Undo command.** Does the tool offer an Undo command that will let developers back out of a task easily at any point? Does the tool make accommodations for group work? Does it give several developers open access to work products in a CASE repository?

Requirements definition

It is crucial to know the specifics of how CASE tools produce definitions of business processes and data. For example, some CASE tools interface to prototyping tools; others provide their own prototyping tools to define requirements.

In the former case, it is important to understand how well a CASE tool interfaces to a prototyping tool. The more sophisticated the interface, the less redundant the work is.

In the latter case, it is essential to assess how well the CASE tool is integrated with the prototyping tool. Can the prototyping tool used to paint a screen also produce entries to the CASE repository for later code generation? Can you define templates so screens have a consistent interface? Does the tool provide controls so that revisions to the prototype do not disturb generated production-grade code?

Exercise
Requirements definition

Circle the appropriate response to determine if the CASE tool you're considering supports developers during the requirements phase:

- It provides cross-references for processes and data. YES NO
- Requirements are input to the tool in an automated manner. YES NO
- It provides some support and enforcement of methodologies/standards. YES NO
- It supports prototyping. YES NO
- The CASE tool prototypes screens and windows. YES NO
- It prototypes navigation between screens. YES NO
- It enables you to test prototypes. YES NO
- The CASE tool generates code for reports and supports specific output devices. YES NO
- The tool creates reusable modules in cases in which requirements call for common routines. YES NO
- It can generate comprehensive test cases from requirements. YES NO

Design

Design phase activities match requirements to the computing environment. Whereas the logical system model built in the requirements phase is unconstrained, the physical system model produced in the design phase is constrained by real world conditions found in a specific computing environment. Until interoperability becomes a reality, developers need to be concerned about the computing environment and any changes to it.

You must consider a CASE tool's support of key design phase tasks. When designing screens, the CASE tool must be able to capture field and window position parameters, color specifications and edit specifications compatible with the operating system, windowing system and terminal capabilities. In this way, program code can be generated correctly and efficiently.

When designing reports, there must be a clear definition of specification details for the computing environment. Report fonts, formatting information, field edits, color and graphical details supported by operating systems and printers must be defined. The design of database information defining security, access rights and data organization must take full advantage of the database protocols provided by specific database management systems.

You will also want to keep an eye on what your CASE tool is doing in the repository area because an internal repository is a very active CASE tool component during design tasks.

For example, when prototyping a screen, all data concerning objects, data and processes associated with the screen are fed to the repository. Then, in the coding phase, the application generator function obtains the data stored to generate, say, a Cobol program for this screen. However, the repository issue is an ongoing one, with no vendor yet providing a comprehensive CASE repository that captures all software development life cycle data.

Exercise
Design

On a scale of 1 to 3, with 1 being "does not support," 2 being "somewhat supports" and 3 being "fully supports," rate how the CASE tool you are considering supports the following design phase items:

- The GUIs important to your organization. 1 2 3
- GUI standards for titles, menu bars and function key assignments. 1 2 3
- Calls and parameter passing. 1 2 3
- The methodologies key to your setup. 1 2 3
- The operating systems integral to your organization. (Related note: Find out how responsive the CASE tool is to operating system enhancements.) 1 2 3
- Reusable specifications. (Related note: Find out how specifications are catalogued.) 1 2 3
- Existing data standards. (Related note: Check whether the CASE tool has its own data dictionary and supports external data dictionaries.) 1 2 3
- Standards for data, file and module names. 1 2 3
- Process modeling. 1 2 3
- Data flow diagramming techniques. 1 2 3

Programming

CASE tools generate code to run on a variety of operating systems and windowing systems and access data with a variety of DBMSs. Therefore, you have to clearly understand the operating environment for which the system will be programmed. Because CASE tools use a variety of techniques to generate code, the evaluation must determine the means used to generate code for a target environment, including any supplementary tasks needed. For example, you may require a language vendor's compiler to compile generated source code and then link it into an executable module.

Defining programming language requirements is a crucial step, with your standards in most cases designating approved languages. However, you don't want to choose a CASE tool that prevents the use of secondary languages. For example, to improve operating efficiency or to take advantage of subroutine libraries, a programmer may need to link unique assembler code to generated Cobol code.

There are other programming language-related factors you have to analyze. Standards may require the use of a specific DBMS language such as SQL, or an operating system may require the use of a specific command language such as IBM's JCL. Multilingual programs will become increasingly prevalent as applications are built using object-oriented DBMSs that may be distributed across networks. For those applications needing to be interoperable across various operating system platforms, CASE tools that appropriately modify their code are evolving.

Exercise
Programming

Check off the CASE tool programming capabilities that are critical factors for you:

- ☐ The tool must support all the programming commands of a needed DBMS.
- ☐ The generated language version must be compatible with your versions for compilers, code analyzers and code re-engineering tools.
- ☐ As new versions of the language are released, the vendor must keep its CASE tool up-to-date.
- ☐ The CASE tool must produce structured code.
- ☐ It must produce efficient code.
- ☐ It must generate meaningful program, data and subroutine names.
- ☐ Generated code may need to include subroutines not generated by the product.
- ☐ Subroutines generated by the CASE tool must be used by external programs that have been programmed using other means.
- ☐ Modifications to executable JCL (or any other needed operating system command language) must be generated and easily modified.
- ☐ The CASE tool needs to facilitate reuse of common subroutines and common data structures.

Testing

Because CASE tools are touted as generating program code quickly and correctly, programmers can typically begin testing their programs immediately. In terms of testing generated code, IS managers will have to assess how well CASE tools support existing testing methodologies. For example, you may require completed programs to be "packaged" for your quality assurance unit to test.

For your CASE tool to be successful in your environment, it must produce programs and documentation that meet packaging requirements. If you use a testing tool, you may want to contact the testing tool vendor and ask how well its product interfaces with the CASE tool you are considering.

Many CASE tools provide a facility for interactive testing, enabling programmers to make changes directly to specifications. This requires programmers to change their technique somewhat because they must correct specifications rather than reprogram code.

With current CASE tools, you might experience the need for some additional coordination during testing. For example, other systems developers working on the same application may be restricted from development during testing.

In selecting a CASE tool, you should give careful thought to how it will support the various types of testing performed in your system development units. Examples of other types of testing include system testing, integration testing, stress testing and alpha and beta testing.

Database

Inefficient database access is the primary cause of degraded performance in generated systems. The performance characteristics of CASE programs may vary significantly, depending on whether programs are generated for transaction processing, reporting or interactive queries.

Therefore, managers need to evaluate how well a CASE tool matches the capabilities of the firm's DBMS.

An organization can have multiple DBMSs or can be considering adding a new type of DBMS. Old applications may use a hierarchical DBMS, while new ones may use a relational one. Separate relational DBMSs may be used for mainframe and local-area network applications. The computing needs of all such internal DBMSs must be factored into the evaluation of any CASE tool.

Furthermore, it is important to make sure that a CASE product you're contemplating will support the data requirements of any up-and-coming technologies you're interested in, such as object-oriented DBMS, file images, voice and video.

When evaluating a CASE tool's data-

base capabilities, flexibility is an important consideration. For example, if a developer changes a data name, a good CASE tool will replace all instances of the data name in a program.

You must also investigate CASE choices to determine if they support complex data access requirements of an application. Keep in mind that often there is a trade-off between complex data access and performance.

Exercise
Database

Put the following list in numerical order (with 1 being the most important feature) to indicate how important the following CASE tool database capabilities are to you. You may weight several items equally.

____ Database dictionary. The product needs to interface with an external data dictionary.
____ Internal database/dictionary. The vendor should provide internal databases/dictionaries easily accessible by other tools.
____ Keys. Find out whether there are restrictions for keys used to access databases and what is the maximum number of keys that can be used. (Related note: Find out whether the product uses established keys or the more time-consuming process of dynamically building a new access path for database access.)
____ Names. The product should support the organization's data and file name standards.
____ Security. The tool must comply with data security standards. (Related note: Check out its audit features.)
____ Tuning. The CASE tool should in some way assist developers in tuning database performance.

Runtime

The most common question asked about CASE tools is, "What is the performance of generated code?"

Vendors often make their products available to prospective customers on a trial basis.

By trying out a CASE tool, systems developers can generate sample programs in their target runtime environment and assess the performance of generated code.

In the case of performance problems, vendors often offer recommendations for tuning their code or altering their runtime environments to improve performance.

Some CASE tools require their own runtime monitors. In such cases, you will want to determine how up-to-date the vendor keeps its runtime monitor through operating system advances. For example, some CASE tool vendors have taken years to incorporate GUI capabilities into their products.

When evaluating a CASE tool, don't forget to look at runtime monitor costs. Runtime monitors typically have price schedules based on the number of application copies generated, the number of active users attached on an LAN or some other use formula.

These cost nuances can make CASE offerings with runtime monitors more complicated to assess.

Computer environment

CASE tools are available for microcomputers, minicomputers and mainframes, differing in their capabilities for each computer environment. Some CASE tools have been designed to optimize performance for transaction processing applications using specific DBMSs. Such applications typically support many data entry workstations or produce a significant quantity of output.

Other CASE products have advantages in generating large applications typically run on mainframes requiring a large amount of memory.

Because computer environment requirements are typically the most concrete, they are often given immediate attention.

For example, your project manager knows his new inventory control system must be coded in Cobol, use IBM's DB2 and run under MVS on an IBM Enterprise System/9000.

Care must be taken in selecting a CASE tool, avoiding the assumption that all generators in such a computer environment provide the same support level.

You must not only determine differences in support for your project manager's current computer environment but also assess the vendor's responsiveness to technology changes.

Exercise
Runtime

To determine whether a CASE tool you're evaluting operates the way you need it to in runtime environments, indicate whether the following statements about the product are true or false:

- The CASE tool supports the operating and windowing systems appropriate for my organization. TRUE FALSE
- The vendor has done a good job of enhancing its product to incorporate new operating system features. TRUE FALSE
- Changes are required to runtime libraries for generated code. TRUE FALSE
- The generated code is portable. TRUE FALSE
- Applications have to be regenerated to run on different operating systems or different windowing systems. TRUE FALSE
- The tool requires a proprietary runtime monitor. (Related note: You may want to find out whether the proprietary runtime monitor is dynamically loaded only when required.) TRUE FALSE
- Generated code performance can be tuned for specific operating systems. TRUE FALSE
- There are restrictions at runtime regarding interfacing to programs not written with the product. (For example, if you have an IBM MVS environment, you may want to find out whether nongenerated and generated code can be linked into one executable load module.) TRUE FALSE

Exercise
Computer environment

Use the following checklist to ask the vendor or another product user about the CASE tool's efficiency for your computing environment:

✔ Maximum size. Find out what the size limit is for a generated program. Are there size limitations for an application?
✔ Maximum users. Determine the maximum number of users who can use the tool concurrently. Does performance degrade as more programmers access it? Is each developer's work protected from being corrupted by another's work?
✔ Memory requirements. Find out how much memory is required.
✔ Response time. What variables affect the response time of tools that generate and test code or of the generated application? What means does the tool provide to tune generated application performance?
✔ Storage requirements. What storage does the tool require for previous and current versions of generated applications? These requirements should include storage for all design data, source code, compiled code and documentation.

Documentation

Examining the type of documentation a vendor provides and how it is maintained is important. The best documentation uses lots of examples, is graphical, has a comprehensive index, is well-organized, caters to different levels of users and has a thorough and easy-to-use table of contents.

Documenting capability

The documentation capability of a CASE tool can be of significant benefit to a company for several reasons. First, it provides at least rudimentary documentation. Developers are known for leaving the documentation task until the end, and oftentimes, little documentation ever gets written. Secondly, having a documenting tool as a component of a CASE tool makes updating documentation to reflect system changes an easier task.

Some CASE tools provide standard text-processing capabilities such as multiple fonts, table of contents and index generation as well as page formatting. Others provide graphical capabilities.

In areas in which the CASE documenting capability lacks graphical options, a company may need to integrate the documentation with a word processor or desktop publishing program. For example, a developer working with a word processor in one window may extract information from a CASE tool in another, compose it into a standard format for a structured walkthrough, then send it to colleagues via an electronic-mail system.

Exercise
Documenting capability

Take the following quiz to assess the ability of the CASE tool you're considering to produce documentation:

- Does the tool support graphics such as data flow diagrams, entity relationship diagrams and state transition diagrams?
- Is there a zoom capability to focus on one segment of a graphic?
- Can graphic components be color coded?
- Can the generated documentation conform to your IS organization's standards?
- What types of documentation (e.g., requirements documentation, run books) can the tool generate?

Change management

To manage system development effectively using a CASE tool, you have to control changes to generated systems. Because changes are made at the more abstract design level instead of at the programming language level, you'll probably need a version control scheme supporting this more abstract level.

In addition, you'll want a control to detect any changes made at the lower programming language level because if changes are made to the code, it gets out of sync with the specifications kept by the CASE tool — a potentially catastrophic situation.

Because of changes and because of the need to have a previous version to fall back on in case of error, there is always a variety of systems versions hanging around. The concept of library management systems, which manage versions of executable and source code, is extended to CASE tools to ensure that versions are synchronized at all levels.

In application development, it is not unusual for several developers to need access to a common program. In such cases, you'll want to make sure each developer's version of a common program is kept inviolate from changes made by others.

Other important change-management requirements for CASE tools include audit trails from specification input to generated code.

Financial analysis

When choosing a CASE tool, you'll want to know how much the tool you want costs. Cost is offset by the particular qualities of the CASE tool: One tool might cost less but have fewer desired features, while another might be expensive but come fully loaded with what you need. No decision should be made based on cost alone.

To take a quantitative view of CASE proposals, most companies use one of the following techniques: net benefit formula (e.g., total benefits minus total costs), net present value formula (e.g., discounted benefits minus discounted costs) or some derivative (e.g., benefit-to-cost ratio, internal rate of return and so on).

Remember that many factors contribute to costs. You can obtain onetime product costs, annual license fees and upgrade costs from vendors.

Don't forget to take into account ancillary costs such as staff training and additional manuals for your developers. You may need extra hardware to support the CASE implementation or you may have to pay a consultant to help out for awhile.

The bottom line is that choosing a CASE tool isn't a single, momentous event. It is a decision-making process based on how well a product meets developer requirements in 12 key categories.

The momentous event will be explaining to the CEO how well your development group is doing. •

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NATIONAL BRIEFS

Bigger picture

▶ Video telecommunications player **Picturetel Corp.** kicked off 1992 by signing six more regional telecommunications firms as dealers — a move that spreads the Peabody, Mass.-based firm's distribution network for dial-up videoconferencing across a total of 33 states. The new so-called **Select Dealers**, each of which pledges exclusive sales and support to Picturetel within a specific locale, range from Florida to Maine, New York to Washington.

Just the tech, ma'am

▶ It has a huge business agenda, 56 offices nationwide and a growing reliance on advanced microelectronic and computer technology — three good reasons for the **Federal Bureau of Investigation** to join forces with Austin, Texas-based research and development consortium **Microelectronics and Computer Technology Corp.** (MCC). And so it has: The FBI became an associate member of MCC last month.

Saab story

▶ General Motors Corp. may not manufacture Saabs, but its outsourcing subsidiary is about to run the information systems activities for an arm of the firm that does. **Saab Cars USA, Inc.**, which imports and distributes the Swedish-built automobiles, is outsourcing its IS and service functions to **Electronic Data Systems Corp.**

Poor communication equals vaporware

BY SHERYL KAY
SPECIAL TO CW

In the software industry, one philosophy has long proved true: Deliver the best product in the shortest time and thereby beat the competition. But the effort to carry this out can lead software executives to make promises to their customers they cannot keep.

For example, during an annual users' conference, the president of XYZ Vendor is told by one of his customers that there is a bug in the firm's new software release. To avoid an embarrassing moment, the president says the company is already addressing the problem, and it should be resolved in a few weeks. One problem: The answer is given without first consulting the research and development team.

"This is a pitfall that management and marketing do fall into," said Ron Souder, president of Alterity, Inc., a software development firm in Arlington, Texas. Executives, he said, often have an overoptimistic view of what can be done technically.



Janell Genovese

"It's very easy to identify an opportunity, realize the window of time within which this opportunity must be seized and then fall into the trap of believing that software can be forced [into creation] within that window," Souder said.

The vendor that falls into the trap is doing users no favor. "If customers aren't sure they can depend on delivery dates or the functionality being exactly what it should be, they have to make major changes in their own business planning," said John Frye, director of product planning at Norwalk, Conn.-based Must Software International.

Sometimes the problem occurs inadvertently, as it did to director of software development Kevin Koestner. The executive management at his employer, Monarch Computex Corp. in New York, had promised textile industry customers a six-month delivery date for a new knitting machine. "They were only concerned with selling the machine itself," Koestner explained, "and it didn't even occur to them

Continued on page 82

Teamwork bridges exec vs. developer gap

The team approach to managing software development seems to be the only effective method. An "us and them" attitude between managers and developers is counterproductive. In fact, some industry observers think this type of division explains why some larger software vendors, with their less intimate working environments, are losing out to smaller firms, where communication among all departments is more easily facilitated.

Success at Performance Technology, said Karen Monroe, president and chief executive officer, has been achieved by team-building. "Marketing, sales and development are all the pillars of the company," she said, "each carrying equal weight."

However, Dave Curtin, a systems development manager at Must Software, only half-jestingly suggests that it might be more beneficial for a vendor's upper level managers to have no technical background. "That way they would have to be very dependent upon, and trusting of, the technical staff to provide them with product development information," he said.

In reality, however, a nontechnical management team may be more of a hindrance than a help to developers. In the late '60s, Donald Pelz and Frank M. Andrews addressed this point in their book, *Management of Scientists and Engineers*. While the best scientist might not always be chosen as the leading executive of a technology organization, they concluded, it should always be a scientist who gets the job.

The book may be out of print, but the wisdom still applies, said Doug Yardas, vice president of operations at Performance Technology. "For the computer industry, that translates to always having technically competent professionals in the highest level executive positions."

SHERYL KAY

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INTERNATIONAL BRIEFS

Once a knight

▶ The chief executive of **IBM UK** has been made a knight in the Queen's New Year's Honours List. **Sir Tony Cleaver**, as he will now be known, won his award for services to industry. Few from the computer industry have been equally recognized. Cleaver outranks the head of ICL, **Peter Bonfield**, who has only a Commander of the British Empire title, but is himself outranked by **Lord Weinstock**, chairman of General Electric Co., PLC.

Siemens' Alphameric link

▶ **Siemens-Nixdorf Informationssysteme AG** has formed an alliance with **Alphameric**, a British provider of touch-screen information displays and satellite data broadcast technology. Under the agreement, Siemens-Nixdorf will market Alphameric's touch-screen retail information system to customers in the UK. The system offers an interactive screen-based sales catalog of up to 100,000 images that provides instant product information and can be updated via satellite links.

Rough road ahead

▶ While **Taiwan**'s computer industry is expected to show 10% to 15% overall growth for 1991, Taiwanese manufacturers are tightening their belts in anticipation of tougher times coming, according to a report last week in the Asian business press. U.S. economic woes, the report said, are clearly taking a trickle-down toll on Taiwan, which in recent years has relied on North America for an estimated 40% of its computer and component exports. The vast majority of firms have seen profits slashed, particularly for "commodity" items such as personal computers, circuit boards, computer mice and monitors.

South American sizzle

▶ **Latin America** is poised to become a hotbed of opportunities for high-tech firms looking to expand their international market presence in the mid-1990s, according to a recent report in the international business press. In 1990 alone, the report said, **Brazil**, **Argentina**, **Venezuela** and **Chile** accounted for $2.7 billion of worldwide computer shipments. While that figure represents only 2% of total worldwide shipments of nearly $142 billion, factors including stabilizing economies and eased import restrictions highlight the region's investment potential.

Intel pushes power manager

Firm will include System Management Mode on all microprocessors

BY MICHAEL FITZGERALD
CW STAFF

SANTA CLARA, Calif. — Intel Corp. said recently it will build power management capabilities into all of its future microprocessors.

Currently, the so-called System Management Mode (SMM) is available only on Intel's 80386SL power management microprocessor. The 386SL is a specially integrated chip targeted toward the portable market.

As one of its features, it has embedded code that can turn off pieces of a computer that use power when not needed. For instance, if a person using a word processing package were to stop typing, the chip would automatically recognize this and shut down until the next key was struck, saving both power and battery life.

Intel's announcement came during a routine technology discussion late last month; analysts greeted the news without fanfare.

"I don't think it's a real big deal," said Michael Slater, editor and publisher of the "Microprocessor Report," a newsletter published in Sebastopol, Calif.

Slater said he believes Intel was trying to spur software developers to take advantage of power management capabilities such as SMM — an undertaking that has thus far proven difficult for the developers.

John Davies, marketing director at Intel's entry-level products group, said OEMs "want to be able to invest in a BIOS and use this across their entire product line" so they can avoid reworking products for different chips.

"If we have power management software written into the BIOS, users maintain compatibility, and it provides a fairly quick-to-market solution for OEMs," Davies added.

Davies also said OEMs believe users would save significantly on electricity bills with widespread power management, a notion that is downplayed by analysts.

Move could cut costs

Dean McCarron, vice president of technology at In-Stat, Inc., a market research firm in Scottsdale, Ariz., said a move toward broad power management could reduce the cost of systems, as desktop vendors could switch from today's 200- to 300W internal power supplies to cheaper, smaller 100W versions.

Analysts pointed out that Chips and Technologies, Inc. offers similar features on its new line of 386 clones, and Advanced Micro Devices, Inc. offers some chips with similar low-power capabilities.

COMMENTARY

Lori Valigra

When 'God' stumbles



Sobriety and self-restraint were in at this season's *bonenkai* year-end parties in Japan. Amid rows of food-laden banquet tables, even executives from Japan's elite companies were reflecting on hard times, their bottom lines pinched by depressed demand in sluggish world economies.

They're hoping that the Ghost of Christmas Present — the fat-shucking, profit-oozing IBM — will not become their personal specter of the future.

Great uneasiness has greeted the recent stumble of IBM, known by many Japanese simply as *kamisama*, or God.

Even though unlocking IBM's stranglehold on world computer markets has been a dream in the past, the unseating of the company by macroeconomic circumstances has turned the dream into a nightmare that could visit anyone.

For some time now, computer-use patterns have shown a move toward decentralization and a need for suppliers to be able to react nimbly to the new demands of today's installations. The point was driven home to IBM in an 85% third-quarter earnings plunge that helped push the company toward its recent move to decentralize and trim costs and overhead.

Just as its initial fattening became a case study of success, IBM's unraveling is becoming a case study for failure, notably in Japan.

Many industrialists here concur with Fujitsu Ltd. Chairman Takuma Yamamoto's remarks at the company's recent *bonenkai*: He welcomed IBM's fat-trimming as a measure that would help restore Big Blue's health.

There's good reason for such competitors to refrain from gloating over IBM's misfortune: Big Blue is a computer industry ecosystem in itself. Its fall from grace presages trouble down the food chain of compatible makers, including giants Fujitsu and Hitachi.

But even Japan, which had been countering some of IBM's sales dips at home and in Europe, is seeing a drop in demand that is hurting IBM more than domestic makers Fujitsu, NEC and other major competitors. How IBM copes with untangling its bureaucracy to create lean, focused business units is intriguing to the Japanese, who are no strangers to bureaucratic overhead.

> IBM'S UNRAVELING is becoming a case study for failure, notably in Japan.

In one sense, that aspect of IBM bred familiarity for the Japanese, making IBM their darling — the foreign success story in Japan, a firm whose service record and product lineup served as a role model for competitors.

"God's" stumbling is not only worrying competitors, who can look in the mirror and see IBM in their reflection; some customers in Japan have been quoted as saying that if IBM can't make it, they wonder who can.

Valigra is an IDG news service correspondent based in Tokyo.

No communication, no product

CONTINUED FROM PAGE 81

that it may be difficult to write the system that drives the machine within the six months."

The result was a stripped-down version of the originally promised machine that compromised on textile design system functionality. "We managed to deliver a functioning product, but we were just lucky this time," Koestner noted.

Not all firms are as lucky. Doug Yardas, now vice president of operations at software developer Performance Technology in San Antonio, recalled an experience with a former employer, a systems integrator for the newspaper industry. "We had a CEO who really fancied being a marketeer and made all sorts of promises," Yardas said. Developers were then given a completely unrealistic time frame within which to complete the work. "Either we never delivered a product, or when we did, it never worked," he said.

Some industry observers see management/development cross-purposes as all but inevitable. "There's a lack of appreciation on both sides' part of the difficulties involved with the other side's job," observed Dave Curtin, a systems development manager at Must Software.

Just as executive managers may be overzealous or poor estimators, some developers do not realize the urgency of getting a product out on time.

Both sides agree on one thing: Communication between business executives and developers is key to quality software that is shipped on time. High-level corporate strategic planning is needed. "Everyone's input is needed before any commitments are made," Koestner said. "Otherwise, you are bound to fall into that vaporware trap."

Communication must also be clear and specific, said Tricia Jordan, a project leader at Sun Microsystems, Inc.'s Federal Division in Milpitas, Calif., citing an example from her own work.

Assigned to manage a workstation security project back in December 1989, Jordan submitted several status reports to management during 1990 suggesting that a lack of human resources was stalling the project. No action was taken.

In January 1991, Jordan submitted a report to management on the same issue. This time, however, she stated clearly that the initial delivery date would not be met and that there was now a new, delayed delivery date. "All of a sudden, I caught their attention," Jordan noted.

"People like me need to get to the bottom line when we are communicating with executive management," she said.

"Remember that everyone's goals are the same," Frye noted. Both management and developers want to produce quality software. The key, he said, is to set targets for the developers that are clearly defined.

Then, he continued, negotiate. "You'll have to compromise on how long the effort will take or what level of functionality the product will offer."

To those in executive management and marketing who think they are still able to make commitments without consulting development, Koestner said, "One day you won't get lucky, and all you will be left with is vaporware. And we all know what happens to companies that are acclaimed for their diverse selection of vaporware."

Kay is a Tampa, Fla.-based business consultant and free-lance writer specializing in emerging technologies and human resources.

EXECUTIVE CORNER

Carns named president and CEO of Systematics

Little Rock, Ark.-based systems integration and outsourcing vendor **Systematics Information Services, Inc.** recently announced that **Stephen A. Carns** became president and chief operating officer of the company, effective the first of this month. Carns came to Systematics from **CAP Gemini America**, where he held the posts of president and COO; prior to that, he served as an executive at **IBM** for 21 years.

Cray Research, Inc. recently named **Martin Buchanan** general manager of a wholly owned subsidiary formed as a result of the firm's acquisition of selected assets from Beaverton, Ore.-based **Floating Point Systems, Inc.** Buchanan, an eight-year Cray veteran, assumes the leadership of the as-yet-unnamed subsidiary after working as senior director of software and application development at Cray Research's Entry Level Systems Division since May 1990. He will report to Cray Research President and COO **John Carlson**.

Dean F. Redfern has joined **Performance Technologies, Inc.** as COO. In addition, Redfern, most recently executive vice president and general manager at **Dun and Bradstreet Software**, was named to his new firm's board of directors. Based in Boston, Performance Technologies develops **Oracle** productivity tools.

San Diego-based **IRT Corp.** recently announced that **Peter W. Sognefest** has been appointed president and chief executive officer; in addition, the company has named Sognefest to its board of directors, filling an existing vacancy. A veteran of the electronics industry, Sognefest most recently served as chairman of **Digital Appliance Controls, Inc.**, an Elgin, Ill.-based firm he co-founded in 1984 and headed up until its acquisition by Emerson Electric Co. last July. IRT Corp. is a supplier of industrial real-time X-ray systems.

A nationwide search for a new CEO to head Boston-based executive information systems software player **Pilot Executive Software** last month resulted in the accession of industry veteran **William G. Nelson** to fill the job. Prior to joining Pilot, Nelson was president and CEO of On-Line Software International, Inc., where he was credited with being instrumental in fueling the firm to a 37% profit growth during 1991.

David VanCronkhite has been named CEO of **Integrated Health Systems, Inc.**, an IBM Application System/400 health care software development, installation and support organization based in La Jolla, Calif. As the new CEO, VanCronkhite, who served as a vice president of **Gerber Alley** for the past six years, said he plans to focus on enhancing the quality of products and services.

Pen-based software start-up **Notable Technologies, Inc.** has named former Computerland Corp. executive **Ronald J. Brown** president and CEO. Brown succeeds Notable founder **Richard Ross**, who will continue to serve as chairman and chief technologist.

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How to finesse on-the-job stress

BY EMILY LEINFUSS
SPECIAL TO CW

Joseph Stricker sets priorities; Jim Durham tries not to get lost in the the big picture; Harold Sample looks for the humor in every situation; and Ron Clift is too stressed out to discuss it.

These information systems professionals are talking about how they cope with on-the-job stress, which is on the rise in IS departments as it is just about everywhere else these days.



For example, keeping up with constant changes and upgrades has long been a tension producer. Coping with system malfunctions can also be hard on the nerves, as can the ever-present knowledge that there is a three- or four-year backlog of applications to develop.

Stress also comes from external business pressures: Downsizing is forcing people to do more with fewer resources; there is mounting pressure from senior management to reduce expenses at all levels; and, with the continual news of layoffs and mergers, additional stress comes from not knowing if yours will be the next job on the chopping block.

"The stress gets worse because people don't perform as well due to concern about losing their jobs. And at the same time, they are striving to perform better in order to keep their jobs," says William Cross, director of IS at Seminole Electric Cooperative, Inc. in Tampa, Fla.

Cross suggests dealing with the worry about job loss by first assessing your organization, both for its financial viability and your own job security. Second, discuss your assessment with your senior manager to see if he agrees with it. Then make a decision.

"If you decide your position is viable, dedicate your efforts in performing for your employer — that is the best way of assuring job security. If it is appropriate to look for a new job, at least you are able to do something proactive rather than reactive," Cross says.

Continuing pressure

A major stress factor for Stricker, director of IS at Centerior Energy Corp. in Cleveland, is a continuing pressure to reduce costs, coupled with having to do more work with less staff and resources. Stricker deals with the stress by prioritizing work and letting his organization know when its expectations will have to be reduced.

"You try to discard the trivial work and concentrate on technology that gives the most bang for the buck in terms of corporate priorities," Stricker says.

Trying not to get lost in the enormity of the big picture is an effective way to deal with job stress, says Durham, assistant data processing manager at Vicco Manufacturing Corp. in Conway, Ariz. Durham works in a small data processing shop with an extremely heavy work load. One of his biggest stress factors is when spur-of-the-moment problems come up, leaving him with four or five projects in partial states of completion.

Juggling all those half-finished projects used to upset Durham, but lately, he says, he just does what he can and doesn't let the rest of the work get to him. "I do the best I can. I set my goals for the day, get as much of those done as possible and try not to worry about the big picture. If I was to look at the whole backlog of problems, it would drive me nuts, so I take it one day at a time," he says.

However, there is a danger of more stress down the road if IS professionals don't remember to take a longer view of technology planning, warns Bob Current, corporate director of IS and telecommunications at EG & G, Inc. in Wellesley, Mass.

Taking a longer view means having to do more homework and analysis, which causes more stress in the short term. But smart planning can save you from more pressure in the future, Current says. For example, buying used equipment might appear a good way to meet cost cuts because it offers a lower capital outlay. However, operating expenses from used equipment may be higher in following years.

If all else fails, look for humor in every situation. Sample, data processing manager at Amerada Hess Corp. in Jackson, Miss., uses laughter to help him get through rough spots. "If I can't see something amusing in the situation, I know I'm losing my grip," he says.

Leinfuss is a free-lance writer based in Sarasota, Fla.

'Lack of slack'

Having too much to do is a usual state of affairs for IS professionals, but the situation has worsened in recent years because of a trend toward streamlined, more competitive, customer-oriented organizations, says Ron Knowles, a partner at Western Management Consultants in Toronto.

Knowles says companies in the '90s are suffering from "lack of slack" — a chronic state of having more to do than can be done in the time available. The causes of "lack of slack" vary. They include: organizational downsizing; participative management; demographic factors such as the prevalence of two-income families, growing urban congestion and inefficient business travel; and emphasis on customer satisfaction.

One particular stress factor for IS professionals is the customer service aspect of their work, Knowles says. "Information technology people are constantly in the position of responding to someone else's needs, and there is a psychological wearing out that takes place after worrying about other's problems for many years."

People are going to have less and less slack as time goes on because the business pressures that cause it — a need to compete globally and perform better financially — are growing.

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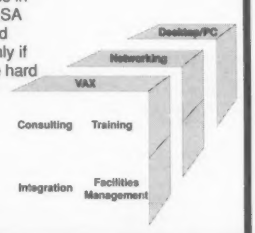
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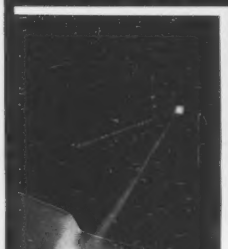
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Legal and computer experience is a marketable combination

Fast Track is a twice-monthly column dedicated to answering questions on career directions.

BY STEVE B. FOGLE
SPECIAL TO CW

Q I am a real estate/corporate attorney who would like to make a career switch to the computer industry. However, I have no formal background in computer science or programming.

I am interested in a program offered by the American Institute for Computer Science. It offers a combined bachelor of science and master's degree program via computer.

While the school is not accredited, I believe that my background and experience would matter more when compared with a 21-year-old fresh from a traditional college. Would this be advisable?

M.J.P.
West Palm Beach, Fla.

A If the computer industry is of great interest to you, these types of programs will help validate that interest. You will find the field quite different from law, and you should probably structure a program for yourself so you can evaluate your interest throughout the process.

I do think there is opportunity for someone like yourself as a practicing attorney in a consulting role to the legal field on information technology. You could also move into a marketing role for an information technology product or service sold to the legal profession.

Q Do you have any ideas that may help me break into the computer or software sales field? I have a degree in computer science and have been in the banking industry for nine years. Most of my experience has been programming with fourth-generation languages.

G.V.O.
E. Amherst, N.Y.

FAST TRACK
CAREER ADVICE FOR THE '90s

A New sales positions in the computer or software industries entail a lot of risk, and you must be willing to move into a commissioned environment. Contact all the vendors you have worked with in your previous jobs and ask for advice and contacts in their organizations.

You should also answer job advertisements in newspapers and trade publications and list yourself with a sales search firm in your area. With this type of network-building, you will probably be able to create an opportunity for yourself.

Q I am a career naval officer who will retire at age 39. I have a bachelor of science degree in information systems with a business minor, have passed the ICCP Certified Computer Programmer examination and will have completed a master's degree before retirement.

My graduate adviser said to pursue a master's in IS because I already have a solid management background. Others have said that an MBA with an IS concentration would be best. Which advice should I take?

M.C.R.
San Diego

A At age 39, you have the opportunity to elevate to a senior level in IS management. I would definitely recommend that you pursue your MBA with an IS concentration. Large companies need IS professionals who are business-minded and understand their industries.

Fogle is regional director at the San Francisco office of the Alexander Group, an executive search firm in Houston.

We welcome your questions. Send them to Kelly Dwyer, Careers Fast Track, Computerworld, 375 Cochituate Road, Framingham, Mass. 01701, or fax them to (508) 875-8931. Letters may be edited for brevity and clarity. Your initials and town will be printed unless you request otherwise.

JOB SNAPSHOT

EDP auditor

Job Snapshot is a monthly column identifying key attributes of IS career positions.

▶JOB REQUIREMENTS: An IS background is becoming an increasingly important qualification. In the past, many EDP auditors came from non-IS areas, such as finance. But the increasing complexity of computer systems is convincing many companies that IS personnel trained in auditing have a better base to handle some of the more technical audits such as operating systems and communications systems.

▶CAREER PLUSES: The job of EDP auditor can be a good springboard to other positions. Because of their exposure to many functional areas, EDP auditors have an opportunity to gain a good understanding of the overall stucture and workings of a company. Auditors also say the nature of the work — identifying problem areas and suggesting solutions — is satisfying.

▶CAREER MINUSES: If you stay within the audit field, you can move up to EDP audit director, but there is often nowhere to go after that. The recession has definitely cut the demand for EDP auditors, with recruiters saying for the first time that there are more applicants than jobs.

▶SALARY ESTIMATES: EDP auditor salaries vary based on industry and region of country, according to *Computerworld*'s recent salary survey. Positions asking for one to two years experience range from $20,000 to $30,000; for three to five years experience, from $30,000 to $46,000; and for senior EDP managers, from $45,000 to $75,000.

▶RECENT CHANGES: In the past, EDP auditors have kept their distance from development — reviewing systems and suggesting controls but not actually implementing the changes they suggest. There is currently a major push under way in the federal government, however, to get EDP auditors involved in the systems development life cycle.

▶REAL-WORLD ADVICE: It helps to understand how to develop systems starting from the ground up. If you have a strong IS track record, says one auditor, you shouldn't have much trouble making the switch. If you don't, get one, either through on-the-job training or academic courses. Professional organizations such as the EDP Auditors Association, Inc. (EDPAA), based in Carol Stream, Ill. [(708) 682-1200] are good places to get exposure and to network, auditors say.

Researched and written by Kathleen Gow, a freelance writer based in Medford, Mass.

Programmer

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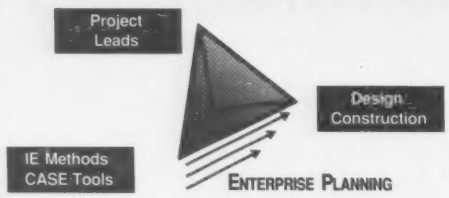
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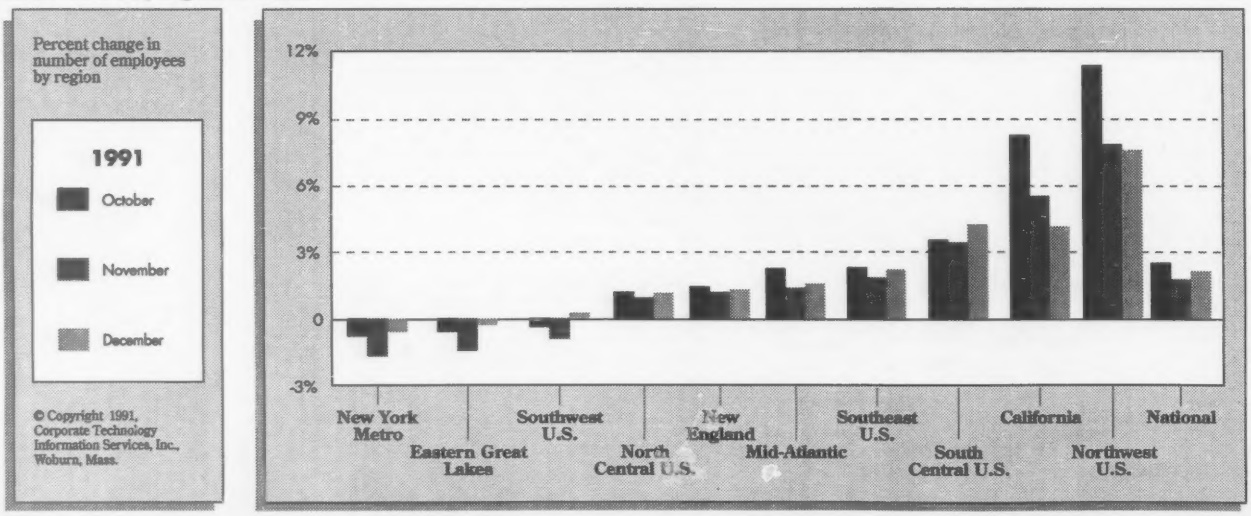
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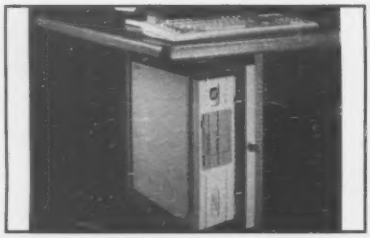
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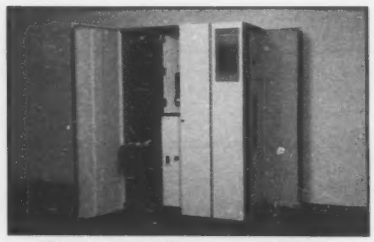
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Data center managers beef up their automation efforts with software

BY DEBORAH ASBRAND
SPECIAL TO CW

For several years, console management software has been the furthest reach of data center automation for most companies. But now, as major vendors respond to increasing user interest with broader product lines, more centers are starting to expand their use of automation products, and with good results.

Rather than employing just one "killer product," data center managers are beefing up their automation efforts with a variety of tools. Console management software continues to be a big seller, but other hot product categories include automated balancing programs and software that monitors a mix of vendor systems, says Arnold Farber, president of Farber/LaChance, a Richmond, Va., consulting firm.

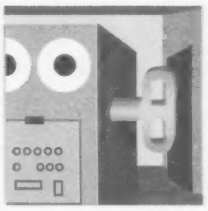
The market's steady expansion hasn't brought product prices down. Data centers can expect to invest a minimum of $50,000 in software once they begin to automate, says Jeff Schulman, vice president of software management strategies at the Gartner Group, Inc., a market research firm in Stamford, Conn.

Schulman adds that because "the return on investment is so quick, the cost of the product isn't a major consideration." In fact, software expenditures often represent 20% of the cost of automation, he says; the majority of automation costs are in implementation and training, organizational changes and the institution of policies and procedures.

Despite the costs, large data centers have caught on to the advantages of automation, according to a 1991 survey by the Association for Computer Operations Management (Afcom), an Orange, Calif.-based trade group that represents 2,600 centers.

Of the survey respondents, 68% use automated tape library systems, 65% employ scheduling software, and more than one-third run report management software and environmental monitoring systems. Among Afcom members, auto-console software is the fastest growing automation product. It is run by 42% of Afcom's members, up from 30% in 1990.

While console management is the keystone of many automation efforts, other lesser known software categories are poised for growth as their virtues become apparent to overworked managers.



Among the software programs ready for the fast track are those that automatically balance reports, thereby freeing staff from the tedious task of manual reconciliation.

To keep work running smoothly through General Accident Insurance Co.'s 24-hour data center — and to keep it from coming back — Jack Brennan, data center manager at the Philadelphia company, uses balancing software to automatically perform more checks than could have been done by the two clerks formerly assigned the task.

With his MVS environment annually processing more than 1 million jobs and 1 billion lines of print, Brennan says the machine-speed checks have become the linchpin of his center's operations. "We no longer waste time and paper printing reports that are out of balance, and I don't have to spend time in meetings with unhappy users," he says.

Unitech Systems, Inc. in Lisle, Ill., had the first entry in the autobalancing market with product U/ACR. Since then, balancing packages have been introduced by Computer Associates International, Inc. in Garden City, N.Y.; Goal Systems International, Inc. in Columbus, Ohio; and Beta Systems Software, Inc. in Concord, Calif.

Another category that's the focus of much vendor activity is automation software that monitors mainframe hosts from various systems makers. Until recently, the lack of automation products for non-MVS environments hampered the conversion efforts of data centers running a mix of vendor systems. That gap is starting to narrow, however, as the major vendors of MVS automation software — including Boole and Babbage, Inc., Candle Corp., Goal, and Legent Corp. — have begun introducing PC-based systems for non-IBM environments.

Beating its larger rivals to the start in the multivendor software category is Votek Systems in Toronto, one of the few small companies to compete in the automation market.

Since 1986, Votek's Comensa program has provided an outboard link to hosts from IBM, Digital Equipment Corp., Tandem Computers, Inc. and Unisys Corp.

Unlike other vendors' outboard products, Votek's system does not use host-resident source code, relying instead on its own generic code and a menu-driven command system.

Asbrand is a free-lance writer based in Boston.

Focus on hardware

Long considered too cumbersome and experimental to be of real use in data center automation, hardware devices are starting to shed their negative image and spark more user interest.

The reason is that such equipment saves enormous amounts of manpower. Robotic tape handlers, for example, can efficiently mount, dismount and store thousands of reels of tape with no human intervention. Roll feeders tackle the equally tedious task of loading paper into high-speed printers.

At KMPG Peat Marwick's Computer Resources Department in New Jersey, one paper feeder stores 62,000 sheets of paper and eliminates the need for an operator to monitor paper input, says Carl Leypoldt, director of resource management. In addition to more efficient use of staff time, the automatic feeders contribute to reduction of paper costs and waste: Leypoldt reports paper use is down 15%.

However, such equipment is costly, running up to several hundred thousand dollars. Still, data center managers say the costs of manual tape mounts are also high, and compared with other solutions, the robotic tape handlers eventually prove economical.

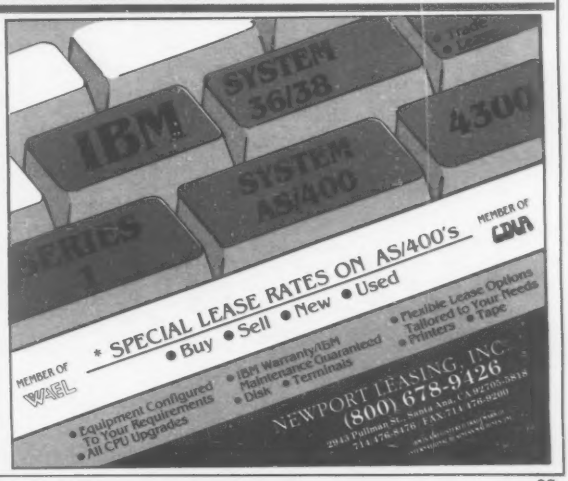
"We couldn't solve the problem with a room full of DASD, and it wasn't economical to back up data over the network and get it off-site that way," says Dave Burns, senior vice president of data services at Affiliated Bankshares of Colorado, Inc., a holding company that owns 27 area banks.

Burns estimates that his purchase of a 6,000-cartridge-capacity tape storage module from Storage Technology Corp., the leading maker of such tape systems, will eventually save his 16-person center $320,000 in labor costs.

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PS/2 Model 60	$900	$1,500	$900
PS/2 Model 80	$2,250	$2,600	$2,150
PS/2 Model 90	$4,300	$4,600	$4,100
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Portable 286	$900	$1,000	$800
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INDUSTRY ALMANAC

As Wall Street braces itself for the onslaught of quarterly earnings reports that are due during the next couple of weeks, investment ratings on big tech stocks reflect analyst ambivalence. As Joseph Payne at Alex. Brown & Sons, Inc. put it, "This is the quarter — maybe even the year — of 'Who knows?' "

KIM S. NASH

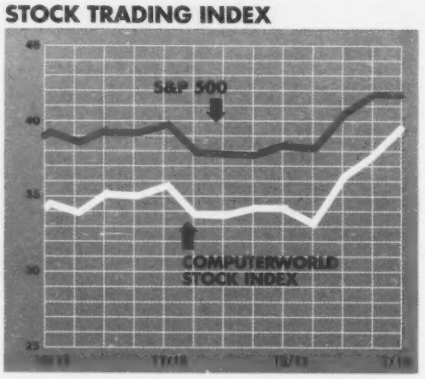
Rank and file

Investment ratings on hardware and chip stocks span the spectrum

Company	Bear, Stearns & Co.	Shearson Lehman Brothers, Inc.
Advanced Micro Devices, Inc.	Hold	Buy
Amdahl Corp.	Hold	Neutral
Apple Computer, Inc.	Hold	Outperform
AST Research, Inc.	Not rated	Buy
AT&T	Buy	Outperform
Chips and Technologies, Inc.	Avoid	Buy
Compaq Computer Corp.	Hold	Buy
Conner Peripherals, Inc.	Hold	Buy
Control Data Corp.	Buy	Neutral
Digital Equipment Corp.	Avoid	Not rated
Everex Systems, Inc.	Not rated	Underperform
Hewlett-Packard Co.	Hold	Not rated
IBM	Hold	Buy
Intel Corp.	Buy	Neutral
Maxtor Corp.	Hold	Underperform
Mips Computer Systems, Inc.	Avoid	Not rated
Motorola, Inc.	Hold	Buy
National Semiconductor Corp.	Not rated	Neutral
Pyramid Technology Corp.	Strong buy	Not rated
QMS, Inc.	Not rated	Buy
Quantum Corp.	Hold	Neutral
Seagate Technology, Inc.	Avoid	Underperform
Sequent Computer Systems, Inc.	Hold	Not rated
Sun Microsystems, Inc.	Strong buy	Not rated
Tandy Corp.	Hold	Neutral
Unisys Corp.	Avoid	Not rated

CW Chart: Janell Genovese

STOCK TRADING INDEX



THIS WEEK'S HIGHLIGHTS

- Microsoft Corp. led an over-the-counter stock rally last week, shooting up 13¼ points and reaching a new 52-week high of 127¼. Other software makers also rode the wave. Oracle Corp. gained 3⅛ points to 18, and BMC Software, Inc. leapt 8 points to 73½.
- Electronic Data Systems Corp. is suing Computer Associates International, Inc., alleging abuse of software copyright, among other charges (see story page 1). EDS shares gained 2¾ points for the week, closing Thursday at 64¼. CA was up ⅞ of a point to 123⅜.
- Hewlett-Packard Co. jumped 4 points to 60 as it prepares to unveil new Unix workstations this week (see story page 1). Advanced Micro Devices, Inc. reported soaring profits for 1991's fourth quarter and the year. AMD added 1 point to 18⅞.
- Among the week's losers, Adobe Systems, Inc. sputtered to 63, down 4¾ points. Borland International, Inc. sank 5¼ points to 80¾.

Computerworld Friday Stock Ticker

CLOSING PRICES FRIDAY, JANUARY 10, 1992

TOP PERCENT GAINERS

Televideo Systems	80.13
Ultimate Corp.	46.15
Alcorp	30.36
Interleaf Inc.	29.03
Computer Automation Inc.	27.82

TOP PERCENT LOSERS

Aldus Corp.	-20.71
Cognos Inc.	-16.35
Phoenix Technologies	-14.29
Analysts Int'l	-11.43
Weitek	-11.32

TOP DOLLAR GAINERS

Microsoft Corp.	12.25
Compression Labs Inc.	6.75
Storage Technology	5.75
Motorola Inc.	5.25
BMC Software Inc.	4.88

TOP DOLLAR LOSERS

Aldus Corp.	-8.75
Matsushita Electronics	-7.25
Adobe Systems Inc.	-5.13
Borland Int'l	-4.50
Digital Equipment Corp.	-2.38

Exch	52-Week		Range	Jan. 10 Close	Wk Net Change	Wk Pct Change
Communications and Network Services					Up 4.74%	
OTC	12.63	5.50	3 COM Corp.	10.75	-0.38	-3.37
NYS	69.75	55.75	American Info Techs Corp.	64.38	-0.13	-0.19
NYS	41.00	29.00	AT&T	41.00	1.38	3.47
OTC	4.13	0.88	Artel Communication Corp.	2.63	0.38	16.67
NYS	54.13	43.00	Bell Atlantic Corp.	46.75	-1.75	-3.61
NYS	54.88	45.38	Bellsouth Corp.	50.50	-2.00	-3.81
NYS	55.25	25.75	Cabletron Systems	55.25	2.00	3.76
OTC	33.25	9.63	Compression Labs Inc.	33.25	6.75	25.47
OTC	5.13	1.50	Data Switch Corp.	1.94	0.06	3.36
NYS	21.50	11.75	Digital Comm. Assoc.	19.75	1.50	8.22
OTC	25.25	14.00	Dynatech Corp.	20.50	0.75	3.80
OTC	12.38	5.00	Fibronix Int'l Inc.	8.25	0.75	10.00
OTC	28.50	7.00	FiberCom Corp.	28.50	4.25	17.53
OTC	3.75	1.13	Gandalf Technologies Inc.	2.50	0.38	17.65
NYS	3.88	2.00	General Datacomm Inds.	3.25	0.25	8.33
NYS	35.00	27.63	GTE Corp.	33.88	-0.38	-1.09
NYS	63.00	46.00	ITT Corp.	56.25	0.50	0.90
OTC	34.13	17.88	MCI Commmunications Corp.	33.50	2.13	6.77
OTC	14.50	3.25	Microcom Inc.	10.25	0.75	7.89
NYS	16.38	4.00	Network Equipment Tech.	16.38	1.13	7.38
OTC	17.25	6.25	Network General	15.88	-0.63	-3.79
OTC	18.88	10.50	Network Systems Corp.	17.50	0.13	0.72
NYS	46.25	26.25	Northern Telecom Ltd.	46.00	0.63	1.38
OTC	64.75	15.38	Novell Inc.	62.25	1.38	2.26
NYS	82.00	67.00	Nynex Corp.	79.88	-0.88	-1.09
NYS	46.75	38.50	Pacific Telesis Group	42.75	-2.25	-5.00
OTC	11.63	5.63	Perrit Data Comm. Ntwks.	7.75	1.00	14.81
OTC	50.75	11.00	Picturetel Corp.	48.50	1.50	3.33
NYS	17.88	11.50	Scientific Atlanta Inc.	17.38	0.63	3.73
NYS	66.00	49.00	Southwestern Bell Corp.	63.13	-2.38	-3.63
NYS	31.50	21.25	United Telecom	25.63	1.88	7.89
NYS	40.75	33.75	US West Inc.	37.63	-1.13	-2.90
Computer Systems					Up 5.34%	
OTC	20.75	6.75	Advanced Logic Research	9.25	-0.50	-5.13
ASE	17.88	11.63	Amdahl Corp.	16.63	0.75	4.72
OTC	73.25	40.25	Apple Computer Inc.	62.25	3.25	5.51
OTC	9.13	2.75	Archive Corp.	4.75	0.00	0.00
OTC	32.75	14.50	AST Research Inc.	20.25	2.25	12.50
NYS	9.38	4.63	Bolt, Beranek & Newman	5.88	0.88	17.50
NYS	21.63	9.75	Commodore Int'l	16.13	0.13	0.78
NYS	74.25	22.13	Compaq Computer Corp.	31.63	1.63	5.42
OTC	2.63	0.38	Computer Automation Inc.	1.44	0.31	27.82
NYS	13.75	7.50	Control Data Corp.	9.75	-0.50	-4.88
NYS	19.75	8.88	Convex Computer	13.75	1.13	8.91
NYS	52.25	29.00	Cray Research Inc.	42.75	1.13	2.70
NYS	22.50	3.75	Data General Corp.	16.75	0.63	3.88
NYS	4.38	1.00	Datapoint Corp.	2.50	0.38	17.65
OTC	36.25	16.50	Dell Computer Corp.	31.13	3.00	10.67
NYS	83.00	48.50	Digital Equipment Corp.	55.50	-2.38	-4.10
NYS	29.50	18.25	Harris Corp.	28.38	-0.25	-0.87
NYS	58.50	29.88	Hewlett Packard Co.	58.50	2.13	3.77
NYS	139.75	83.50	IBM	90.88	0.50	0.55
OTC	12.00	6.50	Information Int'l	7.25	-0.50	-6.45
NYS	145.75	105.00	Matsushita Electronics	110.25	-7.25	-6.17
OTC	20.88	7.88	MIPS Computer Systems	10.63	0.63	6.25
OTC	29.50	10.75	Pyramid Technology	14.00	0.50	3.70
OTC	19.75	7.50	Sequent Computer Sys.	14.38	0.25	1.77
NYS	48.75	22.25	Silicon Graphics	48.00	3.38	7.56
NYS	51.50	20.38	Stratus Computer Inc.	49.00	-0.25	-0.51
OTC	38.63	20.75	Sun Microsystems Inc.	30.88	2.75	9.78
NYS	17.63	9.13	Tandem Computers Inc.	12.75	0.88	7.37
OTC	4.75	1.25	Tandon Corp.	1.38	-0.06	-4.38
NYS	36.50	23.38	Tandy Corp.	27.88	-0.50	-1.76
OTC	31.88	9.75	Teradata	31.88	1.13	3.66
NYS	6.13	1.13	Ultimate Corp.	2.38	0.75	46.15
NYS	7.00	2.13	Unisys Corp.	4.75	0.13	2.70
ASE	5.75	2.00	Wang Labs Inc. (b)	2.88	0.13	4.55
Software & DP Services					Up 4.76%	
OTC	68.50	29.50	Adobe Systems Inc.	60.88	-5.13	-7.77
OTC	12.25	3.50	Alcorp	9.13	2.13	30.36
OTC	59.88	27.00	Aldus Corp.	33.50	-8.75	-20.71
OTC	28.50	16.25	American Mgmt. Systems	24.50	3.50	16.67
OTC	17.25	9.00	American Software Inc.	16.88	2.00	13.45
NYS	4.63	1.88	Anacomp Inc.	4.00	0.38	10.34
OTC	18.25	11.88	Analysts Int'l	15.50	-2.00	-11.43

Exch	52-Week		Range	Jan. 10 Close	Wk Net Change	Wk Pct Change
OTC	15.13	4.38	ASK Computer Sys.	14.63	-0.25	-1.68
NYS	46.38	25.00	Auto Data Processing	45.13	0.63	1.40
OTC	52.25	29.50	Autodesk Inc.	35.00	-2.25	-6.04
OTC	38.50	19.75	BGS Systems Inc.	37.75	0.75	2.03
OTC	74.75	28.75	BMC Software Inc.	71.63	4.88	7.30
OTC	16.00	8.75	Bocle & Babbage Inc.	13.75	0.13	0.92
OTC	86.75	28.75	Borland Int'l	78.75	-4.50	-5.41
OTC	20.88	7.50	Cognos Inc.	10.88	-2.13	-16.35
NYS	11.88	6.25	Computer Associates	11.63	0.00	0.00
OTC	17.75	7.75	Computer Horizons	11.75	2.25	23.68
NYS	80.88	47.75	Computer Sciences	79.00	1.63	2.10
NYS	11.25	7.00	Computer Task Group	8.75	0.63	7.69
OTC	22.75	12.00	Comshare Inc.	16.50	1.75	11.86
OTC	14.00	6.00	Corporate Software	14.00	1.25	9.80
NYS	66.13	37.13	General Motors E (EDS)	63.13	-1.63	-2.51
OTC	18.75	9.25	Goal Systems Int'l	13.00	2.50	23.81
OTC	7.00	2.25	Hogan Systems Inc.	5.38	0.25	4.88
OTC	30.00	9.25	Information Resources	30.00	2.75	10.09
OTC	17.75	2.63	Informix Corp.	17.75	2.25	14.52
OTC	3.63	1.06	Intellicorp Inc.	1.44	0.19	15.04
OTC	31.50	13.00	Intergraph	20.25	1.25	6.58
OTC	10.50	3.00	Interleaf Inc.	10.00	2.25	29.03
OTC	18.25	6.88	Intersolv	17.50	0.50	2.94
OTC	43.25	10.50	Knowledgeware Inc.	17.00	1.63	10.57
OTC	45.00	20.25	Legent Corp.	39.50	0.00	0.00
OTC	40.75	14.75	Lotus Development	28.13	0.63	2.27
OTC	19.00	11.50	Mentor Graphics	16.25	1.50	10.17
OTC	32.00	9.75	Micrografx	17.75	-2.00	-10.13
OTC	125.25	50.38	Microsoft Corp.	125.25	12.25	10.84
OTC	17.75	5.50	Oracle Systems	17.75	2.50	16.39
OTC	10.00	3.31	Phoenix Technologies	7.50	-1.25	-14.29
OTC	24.25	9.00	Platinum Technology	24.25	4.75	24.36
NYS	72.75	39.38	Policy Management Sys.	68.75	1.13	1.66
NYS	37.25	16.00	Reynolds & Reynolds	36.75	1.13	3.16
OTC	15.00	6.75	Ross Systems	13.88	1.63	13.27
OTC	27.50	17.75	SEI Corp.	25.75	-0.50	-1.90
OTC	23.38	13.88	Shared Medical Systems	21.88	0.88	4.17
OTC	35.25	12.50	Software Publishing Corp.	16.00	1.13	8.57
NYS	24.88	7.50	Sterling Software	21.75	-1.00	-4.40
OTC	20.50	9.88	Sungard Data Sys.	19.25	0.88	4.76
OTC	47.50	14.00	Symantec Corp.	47.50	4.75	11.11
NYS	15.50	4.63	System Center Inc.	13.00	-1.00	-7.14
OTC	24.84	8.34	System Software Assoc.	24.25	2.50	11.49
Semiconductors					Up 5.23%	
NYS	19.88	4.83	Advanced Micro Devices	19.25	1.00	5.48
NYS	12.50	6.50	Analog Devices Inc.	9.75	-0.13	-1.27
OTC	13.50	6.50	Chips & Technologies	10.38	2.00	23.88
OTC	59.25	38.50	Intel Corp.	52.75	2.75	5.50
NYS	12.50	5.50	LSI Logic Corp.	9.25	0.25	2.78
NYS	19.13	10.13	Micron Technology	16.13	1.13	7.50
NYS	71.25	45.75	Motorola Inc.	71.00	5.25	7.98
NYS	8.38	3.88	National Semiconductor	7.75	0.88	12.73
NYS	47.63	26.00	Texas Instruments	32.63	1.13	3.57
OTC	12.25	4.75	VLSI Technology	9.00	0.50	5.88
OTC	18.75	4.50	Weitek	5.88	-0.75	-11.32
ASE	6.75	2.00	Western Digital Corp.	3.13	0.00	0.00
Peripherals & Subsystems					Up 7.55%	
OTC	2.75	1.00	Apertus Technologies	1.25	0.00	0.00
OTC	18.50	7.75	Banctec Inc.	18.50	0.88	4.96
OTC	36.50	7.88	Cambex Corp.	35.63	3.13	9.62
ASE	11.75	6.50	Cognitronics Corp.	9.63	0.00	0.00
NYS	29.75	12.50	Conner Peripherals	17.63	-0.13	-0.70
ASE	20.63	7.75	Dataram Corp.	20.63	2.63	14.58
NYS	13.13	4.88	EMC Corp.	12.63	0.38	3.06
NYS	49.75	37.63	Eastman Kodak Co.	48.13	-0.38	-0.77
OTC	11.25	4.75	Emulex Corp.	5.88	0.50	9.30
OTC	24.00	14.75	Evans & Sutherland	19.75	-1.13	-5.39
OTC	9.50	4.00	Iomega Corp.	9.38	0.13	1.35
OTC	26.25	13.00	IPL Systems Inc.	22.00	1.50	7.32
OTC	6.63	1.63	Maxtor Corp.	6.63	0.88	15.22
OTC	18.00	5.50	Micropolis Corp.	10.88	1.13	11.54
NYS	97.50	79.75	3M Corp.	94.88	-0.13	-0.13
OTC	10.75	3.50	Printronix Inc.	3.75	0.00	0.00
NYS	26.75	11.25	QMS Inc.	13.50	-0.75	-5.26
NYS	18.25	8.88	Quantum Corp.	13.50	0.50	3.85
NYS	10.50	4.63	Recognition Equipment	10.13	0.13	1.25
OTC	11.50	4.88	Rexon Inc.	8.25	1.25	17.86
OTC	19.88	7.13	Seagate Technology	10.88	0.75	7.41
NYS	51.50	17.75	Storage Technology	51.50	5.75	12.57
NYS	30.88	16.00	Tektronix Inc.	22.63	1.63	7.74
OTC	0.53	0.16	Televideo Systems	0.28	0.13	80.13
NYS	69.75	38.75	Xerox Corp.	68.13	0.63	0.93
Leasing Companies					Up 0.87%	
OTC	16.25	7.50	Amplicon Inc.	14.25	0.13	0.88
NYS	28.38	18.13	Comdisco Inc.	22.50	1.25	5.88
OTC	18.25	10.25	LDI Corporation	14.75	-0.50	-3.28

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Uniforum showcases new open systems

BY MARYFRAN JOHNSON
CW STAFF

SAN FRANCISCO — The Unix industry's largest trade show opens here next week on the heels of IBM's expected Jan. 21 introduction of new RISC System/6000 models and the next release of its Unix-based AIX operating system.

The Uniforum '92 International Conference will serve as a showcase not only for IBM's more powerful RS/6000s but also for products from 300 other vendors, who will be hawking open systems gear for everything from connectivity to multimedia to X terminals.

Intergraph Corp., for example, will announce its next generation of Clipper graphics workstations and servers this week and then display them at Uniforum.

More so than in past years, there will be a strong emphasis on Unix's growing presence in the commercial world, industry analysts said.

Digital Equipment Corp. will be on hand to announce the first production release of its future Unix operating system: DEC OSF/1, based on Open Software Foundation technologies. Several database vendors are expected to swear allegiance to OSF/1 at the show, which may help assure commercial users of the product's future.

There will also be a flurry of activity from the other Unix camp — Unix System Laboratories, Inc.'s System V Release 4 — as dominant players such as Sun Microsystems, Inc. detail migration plans for their implementation of that operating system.

Several vendors in the Scalable Processor Architecture (Sparc) market are expected to announce firm delivery dates for 40-MHz Sparc products.

"Uniforum will be a kind of stage-setting for the coming year," said Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass. "A lot of the old political battles aren't important anymore. It's time to get down to business and make this a real industry."

Hurwitz and other analysts said Unix vendors are finally realizing that the most serious threat to their success comes from personal computer operating systems such as IBM's OS/2 and Microsoft Corp.'s Windows.

"The marketplace where DOS can dominate is in cost," said Bob Curran, corporate director of information systems at EG&G, Inc. in Wellesley, Mass. The Unix market's ability to introduce better graphics interfaces and less expensive products that compete with Windows in a local-area network environment, he added, is where the true competition for commercial accounts will occur.

HP lauded for fast, flexible stations

CONTINUED FROM PAGE 1

Assembly line workers will be able to view engineering drawings from the X stations, which access a network of HP Series 700 workstations and servers.

Fedex in Memphis is also using HP's Series 700 workstations and X stations in the first phase of a new command and control system for its package delivery business.

"This broadens the range of options customers have about the types of devices they can configure in a network," said Tom Willmott, an analyst at Aberdeen Group in Boston.

Combining X terminals with high-performance workstations "makes tremendous sense to customers," said Gary Eichhorn, general manager of HP's workstation business unit in Chelmsford, Mass. The vendor will offer a host of package deals to promote the concept, including special software discounts from third-party vendors.

One example of HP's "two-seater" package includes a color version of the Model 710 and a color 700/RX terminal for $8,995 per seat or $17,990 for the complete package. The Model 710's 57 million instructions per second (MIPS) is split, leaving each machine with 29 MIPS of processing power. The 700/RX terminals, priced from $3,295 to $5,995, are considered the industry's price/performance leaders, analysts said.

Bob Curran, corporate director of information systems at EG&G, Inc. in Wellesley, Mass., said the two-seater idea is intriguing but must be evaluated for impact on the host system.

"X Window terminals tend to restrict the size of your network and the processing," said Curran, whose company launched an extensive migration to Unix workstations from HP and Digital Equipment Corp. equipment. "When you look at the Unix environment and X terminals and then compare it to buying a windowed DOS machine, it's still cheaper to buy Windows."

Industry analysts said they generally applauded the HP announcement for aggressive pricing and leading-edge performance, particularly on the 50-Specmark Model 710, priced from $9,490 to $13,990. They noted, however, that the $4,990 Model 705 requires another 8M bytes of memory to create a usable system, bringing that base cost up to $6,300.

HP officials said they have already sold more than 2,000 of the Model 710 workstations. Electronic Data Systems Corp., for example, bought 250 of the Model 710s and Model 750 servers to use in its Unigraphics division for software development work.

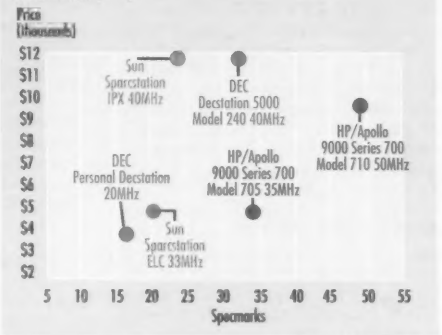
Spokesmen for competitors Sun Microsystems, Inc. and DEC conceded that HP still has the fastest CPU, but they stressed that workstation buyers are looking for more than just raw performance. Availability of technical and commercial applications, balanced systems performance and networking capabilities are equally vital.

"Those are all key factors, but HP is doing a good job there, too," said Nancy Battey, an analyst at International Data Corp. in Mountain View, Calif. "HP is starting to get the key applications, and their service and support is quite good."

Since the March 1991 introduction of the Series 700, HP officials said more than 1,850 Unix applications have been ported to the line. One of the latest to be announced was Intergraph Corp.'s Microstation computer-aided design software.

Sweet spot scramble

HP joins the price/performance battle in low-end workstations



Source: Company reports

CW Chart: Janell Genovese

Color portables' pricing still beyond users' reach

BY MICHAEL FITZGERALD
CW STAFF

Color notebook upstart Dell Computer Corp. announced a lower-than-expected price for its product last week while traditional portable market leader Toshiba America Information Systems, Inc. was said to be readying two AC-powered color laptops for market.

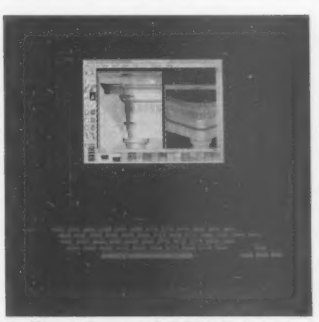
Fueled by these entries, color portables will continue to generate plenty of talk, but analysts and users said that it is only idle chatter so far, as buyers' interest will not be piqued until prices come down to earth.

"Pricing [starts] at $3,500 to $4,000 for passive matrix and $6,000 to $7,000 for active matrix, but with a price erosion of 26% to 30% a year, I think the first quarter of 1993 has the potential to be a good one," said Steve Lair, vice president at Dataquest, Inc. in San Jose, Calif.

Lair said street pricing in portables is going down 2.5% to 3% a month right now, with no letup in sight. At the same time, 386SX-based notebooks with monochrome LCDs will probably be selling in the $1,900 range by year's end.

Even $4,000 was $1,000 lower than the expected starting point for color technology, until Dell said last week that its 6.9-pound 325NC, based on Intel Corp.'s 25-MHz 80386SL power management chip, would be priced at $3,999 with a 60M-byte hard drive. A version with an 80M-byte hard drive will cost $4,299. Dell said it would start shipping the products by the first week in February.

Analysts were impressed by Dell's move but downplayed its actual impact.



Dell's 6.9-pound 325NC *is priced $1,000 lower than expected, but is it low enough?*

"We still don't think a lot is going to happen in [this market in 1992], but already, there is significant price erosion — Dell came out initially saying it was going to price that at $5,000; now it's at $4,000," said Bruce Stephen, an analyst at International Data Corp. in Framingham, Mass.

Despite Dell's pricing, analysts questioned whether a market will develop for passive-matrix color.

"I think passive matrix in color is only a 'passing fancy,' if you'll excuse the pun," said Tim Bajarin, executive vice president at Creative Strategies Research International, Inc. in Santa Clara, Calif. "Everybody really wants active matrix."

While the push toward battery-powered, notebook-size color portables has drawn the attention of the market, the only color portables users can buy today are AC-powered. Compaq Computer Corp. announced last week that its 486C, a 17-pound machine with an active-matrix screen and sophisticated security features, is selling better than expected.

Compaq's vice president of marketing, Lorie Strong, acknowledged that its projections were only for sales in the thousands, but sales were more than 25% better than expected.

Sources said the AC-powered color portable market will gain two more machines on Jan. 20, when Toshiba adds to its color portable line with laptop-size, AC-powered portables with active-matrix color screens.

These will be the smallest color portables Toshiba makes for the U.S. market; it currently produces two luggables with active-matrix screens. The sources said Toshiba would offer models based on both 486DX and 486SX chips, and one source said pricing would probably start below $7,000.

Toshiba refused to comment on the products.

NEWS SHORTS

Japan opens up a little

Japan pledged last week to open its $6 billion public-sector market to non-Japanese computer makers. While foreign computer makers have 41% of the Japanese private market, they have only 0.4% of the national government market, according to the American Electronics Association (AEA). An AEA official in Tokyo said Japan had agreed to ensure that foreign suppliers will be given equal market access, including participation in prebid studies; avoid sole-source contracts except in exceptional cases; establish a bid-protest system; and automatically disqualify unreasonably low bids.

System 7.0 release revamped

Apple Computer, Inc. officials said they are going to eliminate the incremental operating system releases that typically follow the introduction of a new Macintosh. Instead, users of new models will be given a preinstalled operating system extension that supports their machines. Additionally, major functional advances in Macintosh systems software will be sold, instead of offered free. These include such additions as the upcoming Applescript or Open Collaboration Environment.

Relational and OOPs DBMS

UniSQL, Inc. in Austin, Texas, last week announced delivery of what it calls the first unified relational and object-oriented database management system, UniSQL/X for Sun Microsystems, Inc. Sparcstations. The product, installed now at five beta-test sites, allows users to design and implement object-oriented and multimedia applications entirely within the relational database model. User-based pricing starts at $6,000.

Intel to cut 386 chip prices

Intel Corp. said it will cut pricing on its 80386 line of chips by as much as 35% starting in April. Separately, Intel also said it would probably reduce by year's end the cost of its least expensive I486 chip, the 16-MHz 486SX, to $100 each when purchased in quantities of 1,000 — a 50% drop. Analysts cautioned, however, that overall system prices will probably not fall by as much.

Unisys retains contract

Unisys Corp. will hang on to its long-held role as Medicaid claims processor for the Massachusetts Department of Public Welfare. Last month, the agency seemed close to dumping the Unisys subsidiary responsible for the work because of complaints that new systems features had not been delivered as scheduled [CW, Dec. 16]. But a welfare official told *Computerworld* last week that the two parties have agreed that Unisys will add more staff and computing resources to the project and will pay up to $1.7 million in damages if it fails to meet the newly specified milestones and due dates.

Computer underground moves up

Cult of the Dead Cow and several other publications aimed at members of the computer underground are now available in the restricted area of National Security Associates, Inc.'s (NSAI) bulletin-board system. NSAI, based in Herndon, Va., operates the Computer Security Connection, said to be the world's largest compilation of computer security information. NSAI also introduced a Security Awareness Connection, a compilation of publications, tutorials and other information aimed at boosting security awareness.

Radio Shack shuffles execs

Radio Shack, the retail electronics division of Tandy Corp., has a new chairman and three new executive vice presidents. In what Tandy Chief Executive Officer John Roach called a move to "broaden our management team to accelerate short-term growth," the company promoted Bernard Appel to chairman and created a new office of the president comprised of Dave Christopher, James Nichols and Joe Tanner. Appel also assumed the post of senior vice president at Tandy.

DEC tries to improve PC imaging

BY SALLY CUSACK
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. this week will take another swipe at the imaging market by introducing an unbundled version of its Decimage Express software that supports personal computer clients.

Designed specifically to provide enterprisewide imaging capabilities, Version 2.0 has shed the liabilities of its predecessor, said Bruce Silver, director of image management systems at BIS Strategic Decisions, a market research and consulting firm based in Norwell, Mass.

PC client support was lacking in Version 1.0 of the product, which was introduced last year. It was packaged as bundled hardware and software on DEC's 4000 platform and limited the number of users to between 15 and 20.

"The latest release is layered and scalable and offers support for PC clients," Silver said, noting Version 2.0 is a much more viable product for DEC's sales force.

Flexible environment

Decimage Express 2.0 can be installed on any DEC VAX computer, from the workstation to the clustered large system configuration, the company said.

Users will be able to migrate imaging applications to larger VAX platforms, and the product complies with DEC's Network Application Support (NAS) strategy for open, industry-standard software.

DEC will also sell and service Laserview Express software from Laserdata, Inc. Laserview is a Microsoft Corp. Windows-compatible package that brings imaging capabilities to PCs. It also allows image-enabled PCs to operate on a network using NAS and DEC's Pathworks networking software.

For more creativity

For users wishing to write their own imaging software, DEC has introduced Decimage Application Services Version 3.1 for building custom applications.

Within the next six months, DEC plans to introduce Image-now, a layered software from Genesis Software, Inc. designed to make nonimaging applications on host and mainframe systems image-capable. The company also said it plans to provide imaging software specifically tailored for integrating paper-based information into the DEC All-In-1 electronic office environment before the end of the first quarter.

Silver noted that many DEC VAX users have postponed imaging plans, waiting for a complete imaging offering from their vendor, but he cautioned that DEC still has to reestablish credibility with the big companies in the imaging arena.

Image enhancers

Decimage Express 2.0 will ship this month and will be priced from less than $10,000 to more than $200,000, depending on application requirements. It will offer the following:

- Expanded connectivity for document imaging within or across departments.
- Optical storage support ranging from 5G bytes to 734G bytes.
- Send and receive fax capability for documents.
- Improved performance for migration from magnetic to optical disc.

EDS slaps CA with lawsuit on code licensing practices

CONTINUED FROM PAGE 1

The specter of two of the computer industry's pivotal players locking horns in court is likely to have scant short-term impact on users, said Leslie Srager, a computer industry lawyer at the New York-based firm of Phillips, Nizer, Benjamin, Krim and Ballon.

However, he added, the fact that complaints that have long simmered in the marketplace are now coming to a boil in the courtroom points up the extent to which current trends are focusing the spotlight's glare on formerly obscure details of software contracting.



At least one user said he understood where EDS was coming from.

"CA needs a message from the customer base," said Doug Underhill, assistant vice president of technical services at Jacksonville, Fla.-based CSX Corp., a multiple CA user site.

While CSX has been able to work out its disputes with CA short of taking it to court, Underhill said, disputes have in fact occurred. These have included attempts by CA to recharacterize routine platform shifts as major use changes to charge new and higher license fees, he said. "Some of [its] policies and contract interpretations, coupled with the dependence many people have on their products, could be a huge burden on customers."

CA, which declined comment beyond its prepared statement, is also unlikely to have been caught entirely off-guard by EDS' action. EDS' allegations evoke earlier disputes that have erupted from time to time between CA and its users.

Last February, customers contended that CA was charging up to several thousands of dollars for user upgrades from IBM's VSE operating system to the then-new VSE/ESA Version 1.1. CA justified the price hike as rightful in the face of user shifts to a new operating system. Angry users said they saw CA's actions as no more than a segue to a new version of its current operating system software.

Several months earlier, several outsourcing vendors had cried foul over CA's alleged attempts to use outsourcing as an occasion to impose software transfer fees. In both instances, other leading software vendors said they disagreed with CA's characterizations.

To date, neither controversy has taken shape as a lawsuit.

Faced with CA software practices they described as balky at best and unconscionable at worst, some end users have fled to other vendors [CW, Feb. 4, 1991]. This is not an alternative available to EDS, however, the firm noted in its 29-page plea. As a systems integrator and outsourcing vendor, the firm said in last week's complaint, dealing with CA is unavoidable.

EDS is seeking relief as broad-ranging as its list of grievances, from an injunction against CA's alleged wrongful acts to a judicial clarification of the tangled web of contractual and legal relations between the embattled firms. EDS is also asking for monetary damages amounting to three times the sum the court awards.

Senior Editor Rosemary Hamilton contributed to this report.

GE brings order to its LANs

CONTINUED FROM PAGE 1

aggressive" about buying routers to interconnect their LANs, said Stan Welland, manager of corporate telecommunications. "There is no cohesive strategy, no leveraging of overall GE requirements," he added.

The GE companies are looking to turn their LAN interconnectivity needs over to corporate telecommunications because "they felt there has got to be a better way than having 13 businesses doing their own thing, and no one talking to anyone," Welland said.

In addition to reducing expense levels through corporate purchases, companies hope to come up with an optimal corporatewide architecture, a "supernet" that will interconnect LAN users and resources both within and between GE businesses.

While the agreement to turn desktop purchasing over to EDS has "no relation to the telecom department's projects as of now, there is room for overlap as telecom's LAN strategy moves toward the desktop," GE spokesman Bruce Bunch said.

GE users are increasingly engaged in intra- and interbusiness LAN-to-LAN communications that involve bandwidth-intensive applications such as image transfer. "We have got to have a facility to address these needs before everyone starts to do their own thing," Welland said. "We think we've caught it just in time."

GE is one of the first firms to "recognize the importance of having a coherent, consistent LAN internetworking strategy with some degree of standardization," said Ted Klein, president of Boston-based consulting company Boston Systems Group, Inc. "Most companies are at the initial phase of deploying disparate networks, operating systems, routers and policies."

Corporate telecommunications' plans are to "take over [corporatewide LAN installations] up to the router level, take control of the company's network and, over time, go further, to the desktop," said Janet Fields, manager of telecommunications operations at GE.

The department plans to initiate a study of GE's internetworking needs in mid-February with an unnamed consulting company. The department is also working closely with GE Aerospace in order to familiarize itself with users' interconnectivity needs and LAN issues, Fields said.

GE tapped its telecommunications rather than information systems organization for the project, partly because it has no central IS organization but rather a separate group for each of its business units, according to Welland.

In contrast, GE has a single, centralized telecommunications department that recently finished implementing and is responsible for managing the company's global telecommunications network. Centrally managing LAN-to-LAN connections is the next step of that strategy, Welland indicated.

Among the areas to be addressed are the following:

- A coherent buying policy for LAN interconnectivity devices.
- A naming and addressing architecture by which users and devices can access resources across corporatewide LANs.
- Telecommunications connections that meet intersite LAN traffic needs.
- Extending to the LAN level a centralized, end-to-end troubleshooting system that GE recently implemented for its global telecommunications networks.

One major question being debated now is whether GE should continue to maintain separate IBM Systems Network Architecture and LAN-to-LAN backbones or merge the two.

"A number of businesses want to integrate the two on the same transport facility," Welland said.

Tandem to restructure

BY JEAN S. BOZMAN
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. said last week that it would restructure its operations in the face of mounting costs and slowing sales of its fault-tolerant computers.

Tandem plans to take a one-time restructuring charge of $90 million for the first quarter, ended Dec. 31. It will also reduce its work force by 6%, laying off 700 employees. The financial results of its first fiscal quarter will be announced later this month, and details of the layoffs will be provided next month, when half the cuts will take place. The remaining cuts will be implemented in the second and third quarters, Tandem said.

Tandem tried to forestall the layoffs last year by cutting spending and instituting time off without pay, the firm said. In 1991, about 300 positions were terminated through attrition and several small layoffs, resulting in an overall 9% reduction in Tandem's work force of 11,500.

Last week's actions were somewhat overdue, in the view of many Wall Street analysts, who have watched the $2 billion firm's growth slow to less than 5% a year. "They needed to adjust the operating profile of the company," said J. Neil Weintraut, a senior analyst at San Francisco-based Hambrecht & Quist, Inc.

Slowed sales of multimillion-dollar Cyclone mainframes during the current recession kept profitability low, even though lower margin CLX and reduced instruction set computing-based Cyclones sold well, said John Jones, an analyst at Montgomery Securities in San Francisco.

Graphical interface revs up PCs at Price Waterhouse

CONTINUED FROM PAGE 1

the firm buys three desktops for every portable. As early as the end of this year, that ratio will be reversed, Laube said.

That Price Waterhouse is moving to a client/server, GUI environment could have wide-ranging significance, according to Amy Wohl, editor of "Trends-letter" in Bala Cynwyd, Pa.

"This is going to have much more influence than if a General Motors made that decision because GM isn't sending a consultant into your company tomorrow morning to tell you what you should be doing with your computer, with a noteobok in his hand running Windows," Wohl said.

Price Waterhouse will also change the way it supports users. It will hire more sophisticated personnel to deal with the advanced technology it will use, and it will set up regional support centers, rather than having support personnel in each office. The firm's planned technology and support efforts will monopolize up to 30% of Price Waterhouse's information systems budget in 1992, Laube said.

"The driving force behind this is very simple: We're not getting all we can get out of our technology," Laube said. "We think [a corporatewide GUI standard] is going to help us make more use of the technology. To maximize our return, we want [users] to use it more efficiently, which means make it easier to use, and that means GUIs."

Laube cited examples as basic as enabling a user to take a mouse and stretch a cell in Lotus Development Corp.'s 1-2-3 for Windows spreadsheet, rather than having to go to the command line and enter the commands to change the cell size.

Regardless of which operating environment the firm chooses, Price Waterhouse will use Windows versions of its core applications packages — currently, spreadsheets, word processors and communications — plus a standard database and a presentation graphics package.



John Martini

Price Waterhouse's Laube *aims for ease of use with GUIs*

Lotus Notes is already used by 8,000 company employees as their communications package. Price Waterhouse's other 17,000 employees will be using Notes by 1993.

Although Lotus' 1-2-3 and Wordperfect Corp.'s namesake word processor are today's standards, Laube said Price Waterhouse has wiped the slate clean when considering Windows programs.

Laube said Novell, Inc.'s Netware 386 Version 3.11 would continue to be the local-area network environment, although the client/server shift will mean a major change in how the company uses its networks (see story below).

Price Waterhouse will distribute its core software applications with customizations via compact disc/read-only memory (CD-ROM). It will release CD-ROM updates on a quarterly basis to better coordinate and ease distribution of packages.

Laube added that Price Waterhouse will license each core application for all 25,000 employees worldwide and expects to handle security issues through various encryption schemes.

The slow way

Price Waterhouse's move to client/server calls for an unusual "slow-speed connect" networking strategy.

A decision to switch its outbound staff to notebook computers is behind the move to "slow-speed" networking, according to Sheldon Laube, Price Waterhouse's national director of information and technology.

Because Price Waterhouse workers spend a significant amount of time in clients' offices with portables, "applications have to run over phone lines," Laube said. He said the firm has a number of Dbase and Paradox applications that run fine in an office environment but "don't work over phone lines."

In a database request, the machine pulls the entire database in, while in a client/server environment, the user sends in a specific query, and the database is then searched.

Accordingly, Laube said, Price Waterhouse has to make applications usable at data-transfer speeds of 9.6K bit/sec., the highest rate modems currently support. The company will develop applications for this speed for the sake of consistency.

MICHAEL FITZGERALD

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TRENDS

CAD/CAM/CAE SOFTWARE

The CAD/CAM/CAE market experienced a mixed year in the U.S. in 1991, but prospects look brighter in '92 as emerging applications bolster sagging revenue

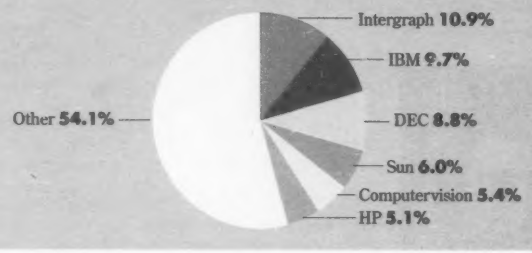
Estimated total CAD/CAM/CAE market size

	1990	1991	1995*
Total revenue (in billions)	$5.0	$5.2	$7.7
Units shipped (in thousands)	206	229	331

Percent of CAD/CAM/CAE market share by total revenue

Total revenue: $5 billion

Intergraph edges out IBM in the U.S. market, generating almost 11% of the total revenue during 1990



CAD/CAM/CAE revenue by application

(in billions)

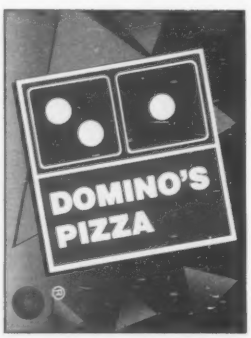
Increased functionality in geographic information systems (GIS) has caused the market to flourish and gain on the more established mechanical application segment

	1990	1991	1995*	Percent of potential growth between 1990-1995
Electronic design automation	$1.3	$1.4	$2.2	69%
GIS/Mapping	$0.66	$0.76	$1.4	112%
Mechanical	$2.2	$2.2	$2.7	23%
Architectural/Engineering/Construction	$0.77	$0.85	$1.3	69%

Source: Dataquest, Inc., San Jose, Calif. *Projected

NEXT WEEK

To strengthen its position as leader in the home pizza delivery wars, **Domino's Pizza** is automating its time-tested "Mystery Customer Survey" system using client/server technology. The company is not alone; firms in every industry are increasingly turning to IS to improve their customer service. See next week's Executive Report.



IBM has announced five major architectural strategies in as many years: SAA, Repository Manager, AD/Cycle, Systemview and Information Warehouse. How have these initiatives fared? In next week's In Depth, noted industry consultant Howard Fosdick grades the five strategies on how well they have lived up to their promise.

INSIDE LINES

Yin and yang

▶ Chief Information Officer Thomas Pettibone, a well-known IS maverick at New York Life Insurance, will leave the firm within six months to join an unspecified new venture. In fact, he's already moved from the CIO suite, replaced by John Foy, a well-reputed New York Life systems man. At neighboring Metropolitan Life Insurance, meanwhile, IS chief Daniel Cavanagh has been named CIO at Met Life subsidiary Metropolitan Property and Casualty in Warwick, R.I. Met Life's new CIO is Bruce Goodman.

Poqet pinching

▶ Santa Clara, Calif.-based Poqet Computer will use the pulpit of Wednesday's Pen Computer Users Conference in Baltimore to introduce a handheld, pen-based system designed for vertical field sales and service applications. The machine will be powered by AA batteries and hence will not be powerful enough to run Windows. Instead the machine, priced under $2,000, will run a version of MS-DOS 3.3 with added handwriting recognition features developed by Nestor in Providence, R.I.

Method acting

▶ Bachman Information Systems, an IBM AD/Cycle partner, will soon cast away its claim to methodology independence. A source close to the company acknowledged that Bachman will begin hyping Hyperanalyst, a new structured methodology co-developed with Chris Gane, a well-known CASE guru who is now a consultant at Bachman. The move pits Bachman against Texas Instruments, which subscribes to the Information Engineering Facility (IEF) method. If that's the case, Bachman will also take on another IEF proponent and fellow AD/Cycle partner, Knowledgeware. Speculation about Bachman's new methodology had the company huddling with IBM to come up with a plan to "kick some life into AD/Cycle," as one observer put it. However, Hyperanalyst is reportedly not supported under AD/Cycle.

Bye-bye buying

▶ Ben L. Berry, manager of computer services at Hughes Aircraft, says his company is looking seriously at leasing PCs to save money. If he leases, he'll go only with Intel I486s because in the volume he needs, he can get a PS/2 Model 90 for $56.34 a month, whereas a Model 55SX costs $57.93.

Aiming the cannon

▶ Could Rod Canion be leaving the dry climes of Texas for drought-stricken California? The PC rumor mill says he is going to join Momenta, a Mountain View, Calif., maker of pen-based systems. Analysts, however, say Canion's name has been linked with numerous companies since he was booted out of Compaq.

Believe it when we see it

▶ Word is that IBM will finally release its SNMP-based network management workstation and multiprotocol router next week. Both systems will be based on the RS/6000. Also, Ameritech is said to be preparing yet another integrated network management announcement for Comnet, after basically striking out with its first effort, based on now-defunct Telwatch's product.

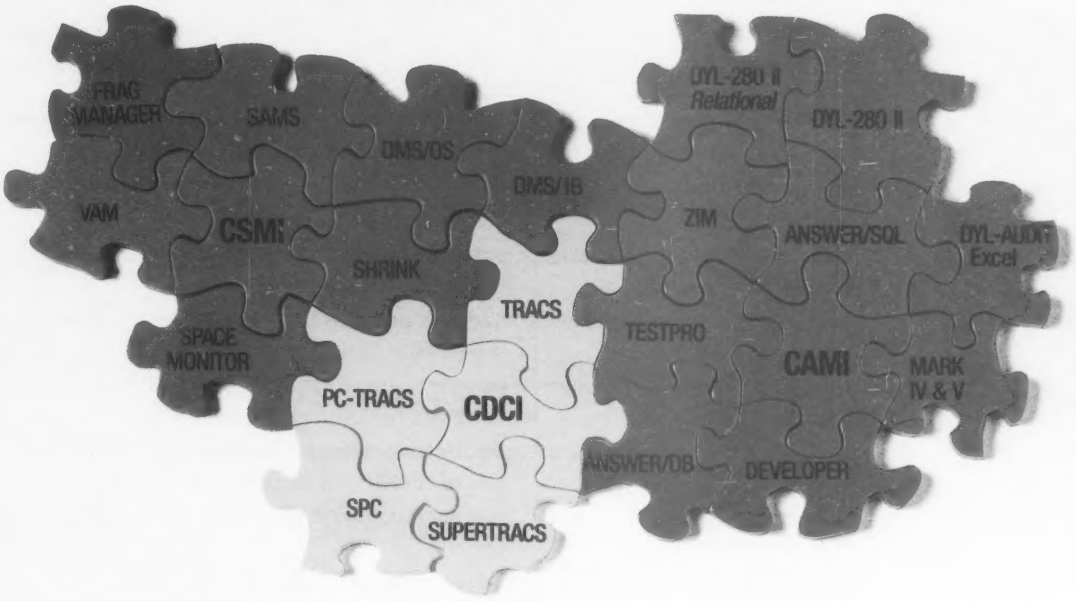
Lotus layoffs under way

▶ In a two-day span last week, Lotus laid off about 70% of the 300 to 400 workers it said it let go as part of a cutback announced late last year.

Despite reports to the contrary, Wordperfect says the biggest concern with its new Windows-based word processor has nothing to do with bugs. "The No.1 call is, 'Where's my license number?' " a company spokesperson said. Wordperfect loosened licensing policies late last year when it started shipping Wordperfect for Windows, and users are startled to see a blank space where their license number used to be, the spokesperson said. News Editor Alan Alper doesn't always get the picture either — that is, without your help. Phone him at (800) 343-6474, fax him at (508) 875-8931, or Compuserve him at 76537,2413.

* CAMI: *Life-cycle applications management* * CSMI: *Automated system managed storage* * CDCI: *Integrated multi-platform, multi-protocol communications* * CAMI: *Multi-platform client/server development* *
* CSMI: *Archival, allocation & compression management* * CDCI: *Automated, transparent data transfer* * CAMI: *Life-cycle applications management* * CSMI: *Automated system managed storage* * CDCI: *Integrated multi-platform, multi-protocol communications* * CAMI: *Multi-platform* *

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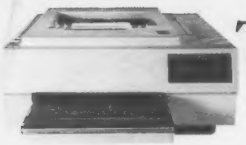
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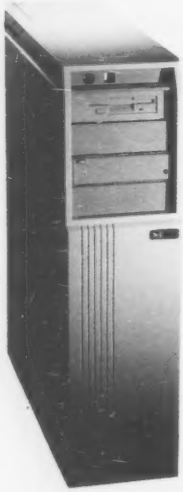
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